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THE METABOLIC FACTOR IN CHRONIC RHEUMATISM WITH SPECIAL REFERENCE TO FIBROSITIS

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In recent years a great deal of attention has rightly been paid to the infective factor in chronic rheumatism, but the vision of some observers has been narrowed too much, and they have entirely neglected the metabolic factor.

The very proper differentiation of gout from the rheumatic group led to a revulsion against the hybrid term "rheumatic gout," as used by Dyce Duckworth and his contemporaries. The tendency was to place gout, on the one side, as an essentially metabolic disease, and the chronic rheumatic diseases, on the other, as essentially infective conditions, and to lose sight of the fact that gout may be associated with one or other of the "rheumatic" conditions in the same patient.

Varieties of Rheumatic Disease

Nowadays it is customary to recognize that arthritis may be divided into two main groups: the rheumatoid type, which is infective in origin and shows a definite increase in the sedimentation rate of the erythrocytes; and the osteo-arthritic type, which is not fundamentally infective in origin and in which the sedimentation rate is not increased.

RHEUMATOID TYPE

This, however, is but a rough-and-ready classification, for the first group can be further separated into:

1. *The Specific Infective Arthritis.*—In this the infective agent is known, as in gonococcal, dysenteric, and typhoid arthritis, to which perhaps may be added the true acute rheumatic arthritis and tuberculous and syphilitic arthritis.

2. *Spondylitis Ankylopoietica.*—One of the two forms of arthritis of the spine described by Buckley, this is closely allied to true rheumatoid arthritis, but presents certain differences of clinical behaviour and localization. It is probably of streptococcal origin, possibly under the influence of a co-operative virus.

3. *True Rheumatoid Arthritis.*—Certainly of infective, probably of streptococcal, origin, and possibly with a co-operative virus, this is specally characterized by a general lowering of the resistance of the patient, with a profound disturbance of the function of the autonomic nervous system and certain metabolic changes such as alterations in the sugar metabolism.

THE OSTEO-ARTHRITIC TYPE

The osteo-arthritic group may likewise be subdivided into:

1. *True Osteo-arthritis.*—This is a degenerative condition associated with local and/or general vascular inefficiency, showing no very definite connexion with infection, but occurring fairly frequently as a terminal stage in arthritis of undoubtedly infective origin. There are some who still insist that osteo-arthritis is of infective origin, and perhaps it would be a confession of ignorance and inexperience to state too dogmatically that it is not, or never can be, the direct result of infection, but the evidence is on the whole against this theory. To infer an infective origin for osteo-arthritis or, indeed, for any chronic rheumatic condition simply on the grounds that they may be benefited by vaccine therapy may be fallacious, for vaccines given in large doses, as used to be done, frequently act like protein shock as a metabolic alterative, and their effect when administered in very small doses, as is the more usual modern practice, is not yet sufficiently understood. There would seem to be little doubt that minute or even diminishing doses of vaccine are effective in many of these conditions, but this hardly corresponds to the general theory of vaccine therapy, and may point to some sort of allergic action on the part of the vaccine.

3. *Climacteric or Metabolic Arthritis.*—This is a dry synovitis with an accompanying bursitis seen particularly in the knees of middle-aged subthyroidic women. Many people regard this condition as an early stage of osteo-arthritis, but there can be no doubt that, whereas osteo-arthritis is a frequent terminal condition in untreated or imperfectly treated cases, this condition does show reasonably definite clinical features, and can be treated sufficiently successfully to prevent the development of osteo-arthritis and to induce considerable clinical improvement, even though it may not be possible to restore completely perfect function to the knee-joints of these elderly and generally sedentary people. In such cases there is no indication of infection and every indication of metabolic pathogenesis. The blood picture is normal, the sedimentation rate is unchanged, and the patients are of a florid type and generally over weight. On the other hand, they usually show the signs of inefficient thyroid secretion—namely, increased weight, sluggish circulation, coarse skin, absence of sweating, flatulent dyspepsia with mild constipation, and falling hair with depilation in the outer segments of the eyebrows. Vaccine treatment does not improve such cases, whereas adequate thyroid medication, a reduction of carbohydrates in the diet, and appropriate measures to increase the vascularity of the affected joints produce marked improvement.

Fibrositis: Its Association with other Rheumatic Conditions

While fibrositis is sometimes associated with the infective group of arthritis, its presence is of minor importance in practically all cases, and it is not usual to pay much attention to it in the treatment of these conditions, though if a little more notice were sometimes taken of this intervening malady the comfort of the patient might be

increased and he might be relieved of a certain degree of unnecessary pain. In the osteo-arthritic group, however, fibrositis is present in every case, and is frequently of marked importance. Not only is it widely distributed, but it is often found that a great deal of the pain, stiffness, and coincident discomfort is due to the fibrositis rather than to the arthritis. Since treatment of fibrositis is much more easy and rapid than that of the arthritis, the patient is likely to be grateful for attention to this part of his or her malady.

Pathogenesis of Fibrositis

In my opinion fibrositis is in the majority of cases metabolic rather than infective in origin, and frequently due to the same sort of factors as in the osteo-arthritic group—namely, strain and trauma, poor vascularity, and inefficient circulation and elimination.

I would not like it to be held that I think that no case of fibrositis is infective in origin, for some certainly improve after infections round the teeth, in the tonsils, appendix, gall-bladder, cervix uteri, and prostate have been removed, and others are benefited by vaccine therapy. On the other hand, there is no doubt that such infections may upset the metabolism, and, as has already been remarked, we cannot always be sure how vaccine therapy produces its effects. Moreover, it is remarkable how often the removal of septic foci or vaccine therapy alone is disappointing in its results, whereas some treatment involving metabolic change may make the difference. The following case illustrates this:

A female, aged 39, complained of severe chronic muscular pain in neck, shoulders, ribs, and hips. This was sufficient to prevent her playing games and to interfere with sleep. At this time she was suffering from very severe anxiety neurosis with very poor emotional adjustment. It was discovered that her tonsils were septic, and the aural surgeon gave a confident prognosis that not only her fibrositis but also the emotional instability would be cured by the tonsillectomy. This, however, was not borne out by the result, and for eighteen months there was no improvement whatever in the rheumatic and very little in the emotional condition. After this time, when it could hardly be maintained that the tonsillectomy could have much effect, her environmental circumstances altered somewhat and she was able to make a better adjustment. With this there was an undoubted improvement in her general health and metabolism, and the rheumatic pains began to diminish, until they ceased to trouble her to any extent.

It would seem in this case that it was the cessation of emotional disturbance, with the consequent amelioration in autonomic and metabolic balance, which allowed the fibrositis to improve. She had had three courses of localized treatment, such as will be described presently, during the period of emotional instability, but these were unavailing until the general health began to improve.

Aetiology of Fibrositis

Although acute fibrositis may occur at all ages it is relatively more common in young people; the chronic form is much more common in middle age and early old age, the period when circulation is failing to maintain its full standard of efficiency, and elimination, particularly by the skin, is becoming lessened by the adoption of a more sedentary habit and by the diminishing activity of the thyroid. In young people I believe that two factors may operate. The first is a relative inefficiency of the thyroid secretion not amounting to anything like myxoedema but interfering with efficient circulation and elimination by the skin. The following case exemplifies this type:

An otherwise healthy young woman of 26 suffered from very severe headaches which seriously interfered with her profession of teaching. Her eyes were practically normal; glasses had been given to her, but had made no difference. The ear, nose and throat had been pronounced normal. The headaches were chiefly occipital and worse in the morning. She was slightly constipated, easily got tired, and practically never perspired. Her blood pressure was 130/74. The periods were slightly irregular and late. The skin was sallow and rather coarse; hair was somewhat thin and came out easily. On examination her neck muscles were hard and hypertonic, with tender nodules right up to the occipital ridge and in the scalp above it. There was no indication of infection in teeth, antra, tonsils, abdomen, or pelvis. The blood count and sedimentation rate were perfectly normal.

As the patient had to go back to work immediately it was not possible to undertake a proper course of treatment at the time, and therefore she was put on ext. thyroid, 3 grains daily, until the next holidays. With this treatment alone she had a much more bearable term, and her headaches were not nearly so persistent. Three months later she undertook a course of massage and hot baths and was immensely improved, and her skin began to sweat freely. It will probably be wise for her to continue with intermittent courses of thyroid for another year and possibly undergo another course of physical therapy, but already her outlook on life has quite changed.

The second type is that in which there is an imbalance in the autonomic system, with consequent inefficiency of circulation and elimination. This type is not either vagotonic or sympatheticotonic, but exhibits symptoms explicable only on the basis of an incoordinated and spasmodic activity of both autonomic divisions. The following case illustrates this type:

A young married woman of 25, "highly strung," had been subject to considerable emotional stress since her husband was in the Air Force. She complained of severe pain "all over her," and marked stiffness of neck, arms, and back. There was no swelling of the joints, and no true limitation of movements, but tender nodules could be found in almost every muscle of the body. No organic disease could be detected on examination, and blood and sedimentation rate were normal. She was, however, subject to irregularities of autonomic function—namely, attacks of palpitation, sweats quite unrelated to exercise or external heat, attacks of constipation and diarrhoea without adequate cause, a migrainous type of headache without ocular phenomena, and at times cold, dead extremities.

Massage, coupled with measures to regulate the circulation in the form of belladonna and hyoscine, together with carefully regulated contrast douches, eventually cleared up her acute fibrositis—at any rate for the time, for in such cases it is, in my view, the autonomic imbalance, which owes something to a constitutional factor, that is really responsible for the fibrositis, and the former cannot be permanently cured.

In the middle-aged and elderly the second type occurs but is not nearly so common as the first, and it seems scarcely necessary to quote a particular case to illustrate this clinical picture, which must be familiar to every practitioner: the florid, fat, subthyroidic person of somewhat sedentary habits—or at any rate whose habits are much more sedentary than they had been fifteen years previously—who complains of pain and stiffness in any or every part of his anatomy, and whose life has become a burden because of an almost constant consciousness of his body's refusal to answer smoothly and painlessly to his will.

Semeiology of Metabolic Fibrositis

As I see it the natural history of metabolic fibrositis is somewhat as follows. In an individual of either sex the efficiency of whose circulation and elimination is reduced by reason of either thyroid deficiency or autonomic imbalance, there tends to be an accumulation of metabolites in the least vascular tissue of the body—namely, the fibrous tissue. This occurs in normal fibrous tissue, but still more in such scar tissue as may be present as the result of a wound or, more commonly, of the organization of blood clot after deep bruising. Hence the

frequency of fibrositis as a late sequela of injury. Since these metabolites will be more plentiful the more muscular activity has taken place, fibrositis will tend to be specially localized in those areas subjected to strain, such as the backs of gardeners, the shoulders of miners, etc. Such a condition, which may be likened to a fire whose ashes are never raked out of the grate, is the soil on which the clinical manifestations of fibrositis are founded. The patient may complain of very little—an occasional twinge of pain or a slight stiffness on rising from a sitting or lying position maintained for some hours—yet by careful palpation it is possible to discover many nodules, plaques, or strands of hardened, inelastic fibrous tissue which are more or less tender to deep pressure. I believe these to be protective barriers laid down by the body to delimit the irritating metabolites.

Such being present, I believe that there is a threshold of accumulation and reactive irritation which may be reached suddenly or gradually. Once this threshold has been passed the clinical manifestations of pain and stiffness develop. If the accumulation of irritative metabolites has taken place in the capsules of joints the reactive barriers which are of the nature of scar tissue will tend to contract and produce real limitation of movement and perhaps deformity. (Compare the periarthritis of the fingers in " Jaccoud's disease," which is quite easily distinguishable from the intra-articular rheumatoid arthritis.) If the reaction occurs in muscles then there will be aching and stiffness and possibly acute pain on moving the muscle, but no true limitation of passive movement. If the reaction occurs in nerve sheaths then neuronic sensory fibres may be caught up and neuritic pains may be experienced, and if motor fibres are involved then a certain amount of wasting may result.

In many of the elderly patients the threshold of clinical manifestation is reached gradually and there is no dramatic onset of the illness, the patient only imperceptibly realizing how aching and stiff he is getting and how painful certain movements are, especially after prolonged immobility. In other cases there is a sudden onset and a discoverable precipitating agency, be this chill, indiscretion in diet, or intercurrent infection such as influenza, tonsillitis, etc. Admittedly it is difficult to ascertain the exact mode of action of such precipitating cause, but it must be that the general metabolism is so rapidly altered that the threshold of clinical manifestation is passed and a more or less acute onset results—and occasionally this onset is most astonishingly acute.

General Treatment

From these considerations it follows that the management and treatment called for in a case of fibrositis will be somewhat as follows.

I would deprecate an abandonment of the orthodox search for a focus of infection, but I would suggest that if such is found the immediate reference to the dentist, the surgeon, and the preparer of vaccines is not the sole duty of the physician. It would appear that to some there is an insidious temptation in the facility of the preparation and administration of vaccines. There is never any difficulty in finding a streptococcus somewhere in the body from which astronomical numbers of micro-organisms may be grown and confined in that rubber-capped bottle which appears so impressive to the patient. I have known such a person to visit a specialist who has no doubt impressively and expensively inserted a hypodermic needle once a week for one, two, and even three years without making the slightest difference to the patient's fibrositis. Such a victim is rightly named " patient."

If septic teeth are discovered one may be removed, and if there is a reaction in the form of general malaise or increase in local pains then others may be carefully and judiciously dealt with. In many such cases, however, little or no effect on the fibrositis may ensue, and extractions should be done on grounds of general health rather than with any expectation of dramatic improvement in the fibrositic symptoms. Infection of the tonsils requires still more careful consideration, and, in my experience, if the patient is over 35 tonsillectomy will seldom, if ever, make any difference to the fibrositis, and in older patients it is a definitely severe operation. It should only be undertaken, therefore, on grounds other than that of the rheumatism. The same applies to the surgical treatment of abdominal and pelvic inflammation, though on account of its metabolic implications such a condition as cholecystitis should certainly be treated on medical and dietetic lines.

Diet and Drugs

The next consideration may well be one of diet. There is no specific diet for fibrositis, but none the less eupepsia is important, and it is necessary to regulate the patient's diet to this end. There seems no particular reason to consider the protein factor except in so far as that elderly people of sedentary habit do not require so much as active adolescents and young adults, and since there is a gouty factor in many of these cases purines had better be reduced. Fats may have to be reduced if there is any intolerance, such as occurs so often in those with inefficient livers, but if the patient likes and can eat eggs without indigestion it is usually quite safe to allow him fats as he wants them. Carbohydrates are generally more important, as many of the subthyroidic type of patient are over weight and suffer from flatulent dyspepsia. The starches are therefore better cut down, but a certain amount of sugar to give a relatively assimilable energy producer is usually permissible. Fruit and vegetables are in almost every case indicated, except where there is any individual idiosyncrasy to a particular article. The main dietetic rule, however, is that whatever the patient can digest easily is permissible, and anything which gives him indigestion had better not be taken or the form in which it is ingested modified.

The bowels must be regulated, but drastic purgation is to be avoided. The use of intestinal douches is not indicated, except perhaps a preliminary clearing or for diagnostic purposes. I believe that a small dose of saline in the morning is of real use, helped, if necessary, by such mild and easily regulated laxatives as paraffin, petrolagar, taxol, and the like overnight.

The next problem is the endocrine one, and in most cases this is simple, for thyroid is what is lacking. Large doses are not required, and in my experience 2 to 3 grains daily for a considerable period, with three weeks' intermission every three months, keeps the patient reasonably well balanced.

The problem of the type with autonomic imbalance is a much more difficult one, and each case must be judged on its merits, but the three most useful drugs in such cases seem to be: atropine, if the vagus is too active ; ephedrine, in cases of low blood pressure ; and hyoscine. The latter may be somewhat unorthodox, but one of the actions of this drug would seem to be to damp down afferent impulses, and I believe it may have this action in respect of the autonomic as well as of the central nervous system, and is therefore useful. Apart from this, drugs only have a place in so far as analgesics are required, and for this aspirin and tab. empirin co. are the best, unless there is a definite gouty factor, when the following pill is useful:

℞ Ext. colchic. ... ... gr. 1
Guaiacol carb. ... ... gr. ½
Sulphur. pp.

Local Treatment

Finally, the specific local treatment must be directed: (1) to free the tissues from the scar-like natural barriers to the irritating metabolites; and (2) to improve the circulation and eliminative functions, especially that of the skin, to remove these metabolites. For this purpose many recommend short-wave diathermy, and so far as I have had experience of it it would seem to be a satisfactory and successful method of treatment; but naturally my own experience lies in hydrotherapeutic measures, and I have found possibilities of successful treatment in these which have not tempted me to use any others.

I believe in a combination of massage and deep baths with an undercurrent douche. An hour's massage is given on alternate days three times weekly, and the baths on intervening days. In my experience this is quite sufficiently strenuous treatment for most people, and that to try to concentrate it further is likely to do more harm than good. As a rule the first week's treatment tends to stir up the pains; a fortnight's treatment is therefore the least time that should be expended, and for most cases three to four weeks is advisable.

The massage given must not be just any massage. This is not realized by many masseurs and masseuses, and doctors are often disappointed in the results of the treatment ordered simply because the right treatment is not given. The masseuse must first educate her fingers so that she can easily locate the thickened nodules, bands, and plaques in the fibrous tissue of the body. She must at her first contact with the patient explore his body so as to discover the exact position and relations of the thickenings, especially those that are tender and apparently responsible for the particular pain and tenderness complained of by the patient. She must then so arrange the position of the patient that the muscles are sufficiently relaxed to enable her to press the nodules against subjacent bone. She must remember that her object is not to increase the tone of muscle fibre, and that therefore all hacking and slapping, often too much beloved by the masseuse as a spectacular demonstration of her manipulative skill, are harmful and to be eschewed at all costs. Her sole object is painstakingly to discover the nodule and rub it away against the subjacent bone. She must at the time realize that such a process may be intensely painful, at all events for the first two or three treatments, though the tenderness often suddenly diminishes after that. She must not, therefore, dwell too long on any one spot, but move from one area to another as her intuition informs her will allow her patient to derive the maximum benefit from her treatment, without being discouraged by being made to suffer too much pain. Without this intuition the masseuse is not likely to be very successful. Above all, she must keep her patient warm, for both types are abnormally sensitive to cold; she must therefore practise making her manipulations under the bedclothes, and must work by touch rather than by sight.

The baths I favour are deep immersion baths, which should be given quite hot at a temperature of 102 to 103° F. Fibrositic patients as a rule stand heat well, and there is little risk of heat exhaustion, as is the case with rheumatoid patients. In this bath should be an undercurrent douche given at a temperature of 107° F. and applied at pressure to the areas of pain and stiffness, since the heat and percussion effect of the douche are admirable stimulants to the local circulation.

Given the correctness of the premise that fibrositis is in many, if not most, cases metabolic in origin, this line of treatment would seem to be logical, and in my experience has proved itself valuable in relieving the patient of his symptoms for a period which may in favourable cases extend to many years.

Conclusions

1. The metabolic factor in the genesis of rheumatic diseases has been too much neglected ever since the essentially metabolic disease, gout, was rigidly, perhaps too rigidly, excluded from the group.

2. This especially applies to fibrositis, which in the majority of cases is metabolic in origin.

3. Infective foci, if they exist, may be the direct cause of fibrositis, but may act by upsetting the metabolic balance and thus cause its onset.

4. Fibrositis may occur in those suffering from subthyroidism or autonomic imbalance.

5. The characteristic thickenings of fibrositis are due to a fibrous barrier of resistance laid down round irritative metabolites.

6. These thickenings may exist before clinical manifestations show themselves. The latter occur when a threshold of irritation is passed.

7. Treatment consisting in removal of septic foci and administration of vaccines is, as a rule, disappointing.

8. The dietary, endocrine, and autonomic balance must be readjusted, and the thickenings removed by short-wave diathermy or massage and hot baths.

BLOOD EXAMINATIONS IN THE PROGNOSIS AND TREATMENT OF PULMONARY TUBERCULOSIS

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I propose to confine my remarks almost entirely to that branch of laboratory work on which I feel that I am best qualified to speak, namely, certain methods used in the assessment of blood changes in pulmonary tuberculosis and their clinical interpretation.

The criteria commonly relied upon in the investigation of blood changes in pulmonary tuberculosis are the total and differential leucocyte reaction, the Arneth count or one of its modifications, and the sedimentation rate of erythrocytes. I propose first to outline the variations in these reactions which may be expected in health and disease, in order to facilitate subsequent discussion of the clinical significance of those changes which are found in cases of phthisis.

Total and Differential Leucocyte Reaction

Recently the importance in pulmonary tuberculosis of the "three key cells," the neutrophil, the lymphocyte, and the monocyte, has been brought into prominence, and much has been done to elucidate the leucocyte response in different phases of the disease. Sabin[1] and her co-workers in America[2, 3, 4] believe that the monocyte, or its derivative the epithelioid cell, in which living bacilli appear to thrive, is a "liability rather than an asset to the body." The function of the lymphocytes, on the other hand, is almost certainly that of surrounding the tubercle, cutting it off from the healthy tissue, and perhaps eventually destroying it, or at least facilitating its conversion into fibrous tissue. The differential leucocyte count is therefore regarded as a method of evaluation of the tissue damage which has resulted from infection. In brief, "the monocyte represents tubercle formation, the neutrophil represents tubercle

* Read in opening a discussion in the Section of Tuberculosis at the Annual Meeting of the British Medical Association, Oxford, 1936.

undergoing abscess formation, and the lymphocyte represents the healing phase of the tuberculous lesion " (Medlar and Pesquera[3]).

There are, of course, no fixed normal figures for the total or differential leucocyte counts, owing to the wide variations which may be found in different healthy individuals. Shaw[16] has shown that during a twenty-four-hour day the total leucocytes per c.mm. of man exhibit two tides, each occupying approximately twelve hours with a variation of 2,000 or more per c.mm. The neutrophils are the cells most affected, and the tides occur regardless of food and exercise.

The Nuclear Count

Since Arneth first classified the neutrophile polymorphs into five groups according to the number of lobes to the nuclei, and later added complicated subgroups, the tendency among other workers has been to attempt to simplify the count. The Schilling modification is well known, and Bonsdorff has reduced the Arneth count to even simpler proportions. This method has been quite extensively used in this country, particularly by Lyle Cummins[5], who found it, together with the differential leucocyte count and the sedimentation rate, of value in the assessment of cases of phthisis.

The Bonsdorff Count[8] consists in the enumeration of the number of nuclei in 100 polymorph neutrophils. Although this number is subject to slight physiological variations it should, according to Cook and Ponder, be approximately 274, for these workers state that in health the number of cells in each class is fairly constant: *Class* I (undivided nucleus), 12; *Class* II, 25; *Class* III, 44; *Class* IV, 15; and *Class* V, 4. Some observers, however, state that the normal Bonsdorff count should be rather lower than this.

The Sedimentation Rate

The significance of the rapidity with which blood resolved itself into its different constituents appears to have been first appreciated by Hippocrates[7]. In 1918 the ancient Greek notion was demonstrated by Fahraeus[8] and Katz[9] to be intimately associated with health and disease, and in 1921 Westergren[10] pointed out the relation between sedimentation rate and activity of tuberculous processes. Since that date the method has been in almost universal use. In this country Lyle Cummins[5], Trail[11], Heaf[12] and many others have applied it in the management of cases of phthisis, and the test is now regarded as a valuable indication of activity or arrest of pulmonary disease, and by some as a significant prognostic agent. It is agreed that serial tests are of infinitely greater value than isolated readings.

The usefulness of the test in following up cases from one institution to another has been diminished by the tendency for different workers to use different techniques. The original Westergren method appears to be still most universally used, but a very large number of modifications have been introduced, and it is unfortunately not an easy matter to express one method in terms of another. It is beyond the scope of this paper to discuss the merits and demerits of the different methods, but there does not seem to be any adequate reason for departing from Westergren's original method in cases where it is possible to obtain blood from a vein. The use of a 200-mm. tube (Westergren) is, I think, to be preferred to the 100-mm. tube, in that "packing" of the cells at the bottom of the tube occurs earlier in the shorter tube, and consequently in rapidly sedimenting bloods the higher readings tend to be inaccurate. The sedimentation curve flattens too soon with the shorter tube.

The mechanism giving rise to changes in the leucocyte reaction and the sedimentation rate in pulmonary tuberculosis is at present imperfectly understood, and the significance of these changes can thus only be appreciated by repeated comparisons between clinical condition and blood picture. As the result of the analysis of nearly 2,000 cases of pulmonary tuberculosis from this point of view I am venturing to express my opinion as to the value of these methods in prognosis and treatment. I have used the following procedure.

Technique

Tests are made as near midday as possible. Blood is taken from a vein in the antecubital fossa with a 2 c.cm. Record syringe and an ordinary serum needle. A few drops are expelled on to a clean slide for making smears and (if necessary) a total count. The syringe is then held vertically, and the excess of blood is expelled into a piece of cotton-wool held round the needle; 1.6 c.cm. of blood is transferred to a small test tube containing 0.4 c.cm. of 3.8 per cent. citrate solution, and well mixed. Smears are next made from the uncitrated blood previously mentioned on clean slides, using a narrower slide or a standard slide with the corners chipped off as a "spreader." It is essential that smears should be of the correct thickness, particularly for the Bonsdorff count; it is better to make them too thin than too thick. The sedimentation tube (Westergren) is then filled to the 0 mark, and placed in a specially made stand with a cork at the bottom and a spring clip at the top. It is essential that the diameter of the tube should not be less than 2 mm., that it should be clean and dry, and that it should be quite vertical in the stand. Normal variations in room temperature do not produce a significant change in the sedimentation rate.

The length of the column of clear fluid is read at the end of one hour. (The normal figure is stated to be 3 or under for males, and 7 or under for females.) The whole of this procedure only occupies two or three minutes. The sedimentation reaction tube should be put up as soon as possible after the blood has been drawn. Blood smears are subsequently stained with the Leishman stain, and examined under the 1/12 objective. The Bonsdorff and the differential counts are carried out at the same time; for the latter at least 200 cells should be counted. There is normally little or no difficulty in differentiating lymphocytes from monocytes. Monocytes appear as large cells, with a round or horseshoe shaped nucleus, showing finely drawn basi-chromatin and a faintly granular cytoplasm.

I emphasize the following points in the technique. It is very desirable, I think, that the blood specimens should be taken from a vein wherever possible. The finger-prick method seems to be unduly subject to error owing to the difficulty in avoiding pressure in the attempt to obtain a sufficient quantity of blood. It would appear that there may be other sources of error in this technique, for Simpson[17] in describing a series of experiments in which blood smears were taken at brief intervals from the same individual recorded a capricious irregularity in the counts, comparable to the density of smoke rising from a fire!

In a similar experiment in which I took six blood smears from an individual at 10-minute intervals, using the stab method and the vein puncture method alternately, I found marked variations in the leucocyte picture by the former method, but constant results by the latter. At the same hour the following day the counts by vein puncture remained unchanged, but there was again a certain variation using the stab method. The sedimentation rates were constant for both methods throughout.

The percentage of cells is apt to vary very considerably in different parts of the slide, and it is of course essential that the whole length and breadth should be covered during the count. The Bonsdorff count requires practice. If the smear is thick an accurate count is impossible; if it is too thin searching for cells becomes tedious. The nuclei should not be joined by more than a fine chromatin filament if they are to be regarded as separate. For those who have not been accustomed to doing these counts it is perhaps as well

to begin on normal individuals who should have approximately 274 nuclei in 100 polymorphs. The personal factor should not, I think, introduce an error of more than ten in a complete count. I no longer use the total leucocyte count, since it does not greatly increase the information to be derived from the differential count, but it does add to the time and labour involved.

Comparison of These Methods

I give some examples of the type of blood pictures which result from the use of these methods in the difference phases of pulmonary tuberculosis.

Case 1.—Quiescent Case		*Case 2.—Active Disease*		*Case 3.—Terminal Condition*	
Neutrophils ...	55 %	Neutrophils ...	63 %	Neutrophils ...	68 %
Class I	13	Class I	25 %	Class I	50
Class II	36	Class II	36	Class II	34
Class III	38	Class III	35	Class III	13
Class IV	13	Class IV	4	Class IV	3
Class V	0	Class V	0	Class V	0
Bonsdorff count	251	Bonsdorff count	218	Bonsdorff count	169
Lymphocytes ...	36 %	Lymphocytes ...	25 %	Lymphocytes ...	19 %
Eosinophils ...	4 %	Eosinophils ...	1 %	Eosinophils ...	0 %
Monocytes	5 %	Monocytes	11 %	Monocytes	13 %
Sed. rate	7	Sed. rate	35	Sed. rate	71
Index	264	Index	161	Index	55

The first is a picture from a quiescent case, showing a blood which approximates to the normal, although a certain degree of " shift to the left " is still apparent from the Bonsdorff count. The second is from a case in which there is activity, but a fair measure of resistance. The third is from a case of extensive active disease in which the resistance has quite given way and toxaemia is profound.

In these cases it will be seen that the various factors which make up the haemogram are in agreement. Thus in Cases 2 and 3 a rapid sedimentation rate is accompanied by a low Bonsdorff count, a low lymphocyte percentage, and a high monocyte percentage. Similarly in the first case, all the elements approximate to the normal. It might be supposed that in every case of active phthisis there would be the same correlation between the different criteria employed, each of which is regarded as an index of activity of tuberculous processes. This unison is by no means the rule however. It is common in pulmonary tuberculosis to find a normal sedimentation reaction associated with a comparatively low Bonsdorff figure: or a low lymphocyte-monocyte ratio occurring with a high Bonsdorff count. This may be particularly observed in serial counts on the same patient; improvement may occur in one of the criteria and not in the others. The question arises as to which of the criteria employed gives the most reliable indication of the patient's progress and pathological condition. I submit the opinion which I have formed of the relative value and significance of the three methods under discussion, based upon the association of the blood findings with the clinical condition and progress of a large number of cases of pulmonary tuberculosis.

THE SEDIMENTATION RATE

This is the easiest test to perform, the least liable to technical error, and in consequence the test most universally used. The interpretation which can be placed upon it, however, calls for considerable modification in different types of case. I have found that, taken by itself, it has very little prognostic value in pulmonary tuberculosis. Many active cases are admitted to hospital with a poor sedimentation rate, but this often improves rapidly under routine treatment, when other factors in the blood picture are far more difficult to influence, and often regardless of focal activity. Moreover, instances are common in which the sedimentation rate remains within normal limits, although it is apparent from clinical and *x*-ray evidence that an active lesion is present. On the other hand, in a certain type of case a rapid sedimentation rate is compatible with a very chronic lesion associated with little or no toxaemia. It has in fact been notable in my own series of cases that many of the higher readings for the sedimentation rate have occurred in this type of case.

Fluctuations in the sedimentation rate seem almost comparable with variations in the patient's weight—most patients gaining weight when under treatment often regardless of underlying pathological processes. In fact I would suggest that one important factor in the production of a rapid sedimentation rate is disturbed metabolism. A rapid rate is frequently found in association with dyspnoea and with cases in which bronchitis is a prominent feature. Chronic bronchitis uncomplicated by tuberculosis does not usually occasion an acceleration of the rate[13].

Toxaemia no doubt plays a direct as well as an indirect part in accelerating the rate, but it is notable that acute infiltrative toxic types of case frequently give lower readings than the more chronic forms. Prolonged rest in bed, except in the most advanced cases of phthisis, will often bring the sedimentation rate to within normal limits. The other factors in the blood picture may not however be correspondingly improved.

I have concluded, therefore, that the sedimentation rate, taken by itself, is not a reliable indication of a patient's state of resistance to his disease or of the state of activity of his lesion; nor can it be used alone, for the comparison of the condition of one patient with another. I believe, however, from clinical observation that it is a valuable indication of disturbed metabolism and the constitutional disturbance resulting from the disease, and as such it has a definite place in the blood picture. I do not believe, however, that minor fluctuations in the rate are of sufficient significance to justify the extreme precautions against inaccuracy which are sometimes advocated.

THE DIFFERENTIAL COUNT

When one considers that in any case of pulmonary tuberculosis there must be many separate lesions in different phases of development and healing it is not surprising that inconsistencies in the differential count are met with, and that such counts are often difficult to interpret. In counts repeated daily for two or three weeks, however, I have found that the percentages of cells remain fairly constant in the absence of clinical change in the patient. Repeated differential cell counts at longer intervals during treatment do, in a large number of patients, show quite definite changes. In a patient who has improved, the percentage of lymphocytes may be doubled at the expense of the neutrophils, the monocytes percentage may be decreased, and eosinophils previously absent may reappear. On the other hand the reverse process will be observed where uncontrolled activity of disease has supervened. I think it is unwise to attempt too close an interpretation of minor fluctuations in the cell percentages, if only for the reason that there is liable to be a small error in performing the count, unless four or five hundred cells are counted. However, in my experience an adult patient with 35 to 40 per cent. of lymphocytes at the commencement of his treatment has a better prospect in his fight against his disease than one with only 20 per cent. A relative lymphocytosis appears to indicate a good potential resistance to the disease. There are many exceptions, however, to such a generalization, and I believe that to rely solely on this aspect of the blood picture for definite information would often be misleading.

THE BONSDORFF COUNT

This is invariably deflected from the normal when there is any auto-inoculation from a tuberculous focus. In some

2,000 cases of phthisis I have found very few which did not show a certain degree of shift to the left, or lowering of the Bonsdorff count, and most of the exceptions have been in quiescent cases. The Bonsdorff count cannot be correlated purely with the extent of disease, and activity may apparently depress the count to a far greater extent in one case than in another. As a general statement one can say, I think, that the Bonsdorff tends to be lower in acute forms of the disease than in the more chronic type. I have concluded that this count is a reliable indication of toxaemia in pulmonary tuberculosis.

Clinical Deductions

It would appear therefore that in pulmonary tuberculosis the sedimentation rate, the differential leucocyte count, and the Bonsdorff count each represent a different aspect of the patient's reaction to his infection. I would suggest that increase in the sedimentation rate represents constitutional disturbance, decrease in the Bonsdorff figure represents toxaemia, while it has been shown by many workers that the differential leucocyte count reflects the changes which are occurring in the diseased areas in the lungs.

Lyle Cummins, using the blood picture as one factor in the assessment of cases of phthisis, proposed a system whereby marks were allotted in respect of the different criteria, in order to reduce a complicated series of figures to a simpler and more easily comparable form. It is certainly necessary, in view of the fluctuations which occur in the component figures of serial haemograms, to have a method of summarizing the information derived from each source. In my own work I have adopted the principle of balancing those factors in the haemogram which can be described as "assets" to the patient against those which are "liabilities." Thus a high Bonsdorff and a high lymphocyte percentage are assets, and a high sedimentation reaction and high polymorph and monocyte percentages are liabilities. The formula, which I have previously described in detail[14], is as follows:—

$$\text{V.B.} - [\text{S.R.} + (\text{P} + \text{M} - 2\text{L})] = \text{Index.}$$

Eosinophils being regarded as assets are added to the lymphocyte percentage. The index ranges from zero in the worst cases to 300 in the best cases, and I regard any figure above 260 as within normal limits. This index has been in routine use at Colindale for the past five years, and I have no hesitation in saying that it gives an accurate indication of the pathological status of the patient at the time of making the test.

Prognosis

In the interpretation of the blood picture in prognosis I believe that considerable caution is necessary. As a means of ascertaining the precise condition of the patient at the moment, the method is invaluable, but it must be remembered that the exhibition of a good blood picture is no real guarantee against future relapse. One is certainly justified in drawing a satisfactory conclusion if in spite of the presence of infiltrated lungs the blood picture is not unduly depressed. If, on the other hand, when the *x*-ray reveals only a small early lesion the blood picture shows great all-round deterioration, the prognosis is undoubtedly a grave one. Compare, for example, the following cases:—

Case 4.

Polymorphonuclears	52
Lymphocytes	39
Eosinophils	4
Monocytes	5
Blood count	239
Sedimentation rate	41
Index	227

Case 5.

Polymorphonuclears	70
Lymphocytes	22
Eosinophils	0
Monocytes	8
Blood count	211
Sedimentation rate	35
Index	42

Case 4.—A man, aged 38, afebrile, and with tubercle bacilli in the sputum, responded well to treatment. He put on 1 stone in weight, and returned to work. The blood picture though far from normal is so much better than the *x*-ray picture suggested, that it was safe to assume that he had considerable powers of resistance, that his disease was not of a very active type, and that he had it well under control.

Case 5.—A lad, aged 18 and afebrile, had no sputum at the time of blood test. Left artificial pneumothorax was induced, but the opposite lung broke down. The poor blood picture resulting from an early lesion, far less extensive than case 4, indicated a comparatively poor resistance and bad prognosis.

Case 6.—The blood picture of a member of the hospital staff who had a blood test as one of a series of normal individuals. Two years later he had a haemoptysis, and a small acute lesion was found at one apex. The second blood picture indicates some toxaemia, but the sedimentation rate is still normal because the general condition has not yet deteriorated, and there is no appreciable constitutional disturbance. He has been back at work for over a year.

	17/3/32	15/1/34
Polymorphonuclears	57	71
Lymphocytes	36	23
Eosinophils	1	1
Monocytes	6	5
Blood count	274	237
Sedimentation rate	3	4
Index	282	205

So far as immediate prognosis is concerned it can be stated that of those patients admitted to hospital with a blood index of less than 120 (a purely arbitrary figure), 72 per cent. died, and of those who survived and passed out of the hospital 60 per cent. died within a few months of discharge.

Case 7.—An example of this type of case is a man, aged 26, with somewhat extensive disease of both lungs. He was on routine treatment at Colindale for ten months; he apparently did well, put on weight, and had consistently normal temperature. He performed the heaviest grade of work without any distress.

	14/2/33	8/12/33
Polymorphonuclears	68	67
Lymphocytes	25	29
Eosinophils	1	0
Monocytes	6	4
Blood count	179	157
Sedimentation rate	83	38
Index	74	106

In view of the very poor blood index on discharge, one was not surprised when he was re-admitted two months later in a dying condition.

With the kind co-operation of the tuberculosis officers of some of the London boroughs, I was able to follow up 107 patients of whose blood condition on discharge I had a record. Of those cases with an index above 180 on discharge, 84 per cent. were stated to be at work: of those with a figure below 180 and above 120, 24 per cent. were at work and 63 per cent. unfit; of those with an index below 120, 36 per cent. were unfit and 60 per cent. were dead. Apart, therefore, from our own observations on cases under treatment, the blood picture and index would seem to be of value in forecasting the patient's capacity for work and his immediate prospects on leaving hospital. A blood test taken during an acute exacerbation of the disease would of course give an unduly depressed blood picture. Acute pleurisy and acute pleural effusions depress all the features of the haemogram to an exaggerated extent, and blood tests taken at these times will produce unduly pessimistic figures. Such considerations are of obvious importance if the blood is to be used in prognosis.

The Blood Picture in Treatment

When a patient first comes under observation and his future treatment is under consideration, it is necessary to decide whether the disease is advancing, stationary, or

retrogressive, what is the degree of toxaemia or constitutional disturbance, and what margin of resistance the patient possesses. I believe that these questions can be answered more accurately by the blood reaction than by any other single factor. One cannot lay down any hard-and-fast rules, but the following observations may be of assistance in determining what line of treatment is to be adopted in a particular case.

Ordinary periods of routine sanatorium treatment do not tend to bring about great improvement in the blood picture. Patients who begin treatment with a comparatively high blood index (above 200) may return to normal standards by routine measures alone, but in the majority the improvement in the blood picture is but slight and is confined to improvement in the sedimentation rate. Those whose initial blood index is low are unlikely to show very great improvement in the index after routine treatment.

Following successful artificial pneumothorax treatment, in unilateral disease, improvement in the blood picture is dramatic, and may within two or three months be completely normal. This, however, is no guarantee that the case will not relapse, but is an indication that for the moment auto-inoculation has been completely controlled. Subsequent deterioration in the picture will indicate reactivity. I have found that cases commencing artificial pneumothorax treatment with a very poor, toxic blood picture are more liable to subsequent relapse than those who had previously exhibited a fair measure of resistance. I believe, therefore, that it is often as well to delay intervention until the maximum improvement in the blood picture has been obtained by rest, even at the risk of the formation of adhesions in the interim. Decrease in the sedimentation rate alone is of little value in this connexion as a criterion of the establishment of resistance. If the patient fails to show improvement, possibly owing to massive infiltration, then one has no alternative to intervening. The same observations apply, perhaps more forcibly, to the application of thoracoplasty. If definite improvement in the blood picture has not occurred within six weeks of artificial pneumothorax induction, the operation is unlikely ultimately to be beneficial, unless a more satisfactory collapse can be obtained.

Patients in whom bronchitis is a prominent complication are notoriously unsatisfactory subjects for collapse therapy. They often become dyspnoeic and lose weight, and constitutional disturbance is so great that the treatment has to be abandoned. Such patients frequently give a typical blood picture, the chief feature of which is the wide discrepancy between the sedimentation rate and the Bonsdorff count.

Case 8.

Polymorphonuclears ...	70	Monocytes	5
Lymphocytes	22	Bonsdorff count ...	248
Eosinophils	3	Sedimentation rate	52
Index	171		

The explanation of this type of blood picture seems to me to lie, first, in the fact that such patients are usually suffering from a chronic fibroid type of disease with but little tuberculous toxaemia, and in consequence there is but little shift to the left of the neutrophils; and secondly that deficient aeration through fibroid and possibly emphysematous lungs has brought about profound changes in metabolism, with a consequently poor sedimentation rate. Finally, there being very little tendency either to activity of tuberculous processes or healing in the lungs, neither the monocytes nor the lymphocytes are increased in the differential count.

This "bronchitic blood picture" is not uncommonly met with in cases in which there is no apparent element of bronchitis. We have found, however, that such patients frequently fare badly when artificial pneumothorax is induced. They lose weight and become dyspnoeic and generally distressed.

It must be remembered that the discrepancy between the Bonsdorff count and the sedimentation rate is only one of degree, and that indefinite blood pictures will occur. Artificial pneumothorax treatment would not of course be withheld in an otherwise suitable case on the strength of a bronchitic type of blood count alone, but one would certainly hesitate before recommending such a case for major surgery—or even for a permanent phrenic operation. Case 9 is of interest from the point of view of comparison with the foregoing type of blood picture. It shows the effect of a thoracoplastic operation on a unilateral lesion in a man aged 42.

Case 9.

Polymorphonuclears ...	61	Monocytes	5
Lymphocytes	33	Bonsdorff count ...	255
Eosinophils	1	Sedimentation rate ...	97
Index	190		

The test was made six weeks after operation. The lung was well collapsed, the sputum was negative, and the temperature normal. He was inclined to be dyspnoeic, however, and recovery from the operation was rather slow. Hence, although there is no appreciable tuberculous auto-inoculation (Bonsdorff 255), the constitutional disturbance is reflected by the rapid sedimentation rate.

This case serves again to emphasize the view that a rapid sedimentation rate is often due to the remote effects of the illness rather than directly to tubercle formation and the spread of tuberculous disease. An ineffective or inadequate collapse of the diseased lung by thoracoplasty will be betrayed by failure of the Bonsdorff count to revert to normal. In a patient who has stood the operation well the rate may quickly improve with bed rest, even though the pulmonary lesion is inadequately controlled.

When it is decided to re-expand the lung on the completion of artificial pneumothorax treatment, there should be no falling away in the blood index as the lung again comes into action. This would obviously indicate, in the absence of some other cause, a recrudescence of focal activity.

For the assessment of progress under treatment the blood index has an obvious application. An example of its value is a case in which phrenic evulsion has been performed as an alternative to artificial pneumothorax: if substantial improvement in the blood picture does not occur, further treatment will have to be considered. Considerable improvement in the haemogram frequently follows phrenic operations, presumably owing to limitation of auto-inoculation and promotion of healing by diminished movement. Sanocrysin may be of benefit to those patients who already have a reasonably good blood picture, but those with a toxic blood picture are liable to be made worse[4].

Conclusion

I submit that limitations in the value of the methods of blood assessment are largely technical. Blood counts take time (perhaps a quarter of an hour for each count), and although the technique is not difficult to acquire, some experience is necessary before consistent results can be obtained, particularly in the nuclear count. I consider, therefore, that every centre for the treatment of tuberculosis should have the services of a technician who is able regularly to devote part of his time to blood examinations. Casual blood counts undertaken by inexperienced observers probably have little or no value. The complete blood picture with the summarizing index is of infinitely greater value than any single method, but the nuclear count is probably the most reliable single criterion of tuberculous activity and toxaemia.

It has been suggested that the modern tendency in tuberculosis is to treat *x*-ray films. But, as Medlar[15] has said, "the final outcome depends more upon the underlying pathological condition than it does upon the presence or absence of signs and symptoms. For the clinician, the nearest approach to the pathological status of tuberculosis is the leucocyte reaction."

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INHALATION THERAPY

BY

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Inhalation therapy has been but little used in England. It is claimed that the tracheo-bronchial mucous membrane has great absorptive power and that drugs given by this method are rapidly absorbed into the blood stream. The experimental work has mainly been carried out in Germany; dogs, cats, and rabbits have been used: atomized liquids have been supplied to these animals, and the size of the droplet required for inhalation therapy has been determined on the basis of animal experiments.

Wolfgang Heubner,[1] in a paper on the inhalation of atomized liquids, dated 1919, gives an interesting account of this work. The earlier experiments consisted of injections of various solutions and suspensions into the trachea of an animal which was killed a few minutes later, the lungs immediately being fixed and examined. H. Nothnagel[2] allowed rabbits to aspirate their own blood; three and a half minutes later the animal was killed and the lungs were examined immediately. Red blood cells were found in the interstitial tissue of the lungs, in the lumen of the smaller bronchi with their long axes at right angles to the bronchial walls, and in the act of penetrating between the cells of the bronchial epithelium.

W. Fleiner[3] found that the absorption of particles of Indian ink after tracheal injection was extremely rapid. He claims that carbon particles may reach the lymph nodes in twelve seconds. Sehrwald[4] injected a solution of dye into the trachea of a rabbit and half a minute later caused the animal to inhale lycopodium; immediately afterwards the rabbit was killed and the lungs were examined. In the lumen of many small stained bronchi were unstained lycopodium granules. The dye solution must therefore have been very rapidly absorbed.

A further demonstration of the rapid absorption of solutions in oil or water is afforded by the experiments of Heubner. He injected a concentrated solution of malachite green into the lower part of the trachea of a cat and killed the animal by dividing both carotid arteries, while perfusing the vascular system through the jugulars to wash away as much blood as possible. The respiration stopped in two minutes and the heart in four minutes. On dissection the muscles were found to be stained green, especially on the breast. The heart and liver were deeply stained; the intestines, kidney, bladder, urethra, and intima of large arteries were lightly stained. The spleen, peritoneum, pericardium, and urine were unstained. In the lungs the smaller bronchi were deeply stained; dye had reached many alveoli and had perfused outward. The pleura was unstained. He calculated that the maximum time for absorption had been sixteen minutes.

Atomized Liquids

A similar test, using an atomized liquid, was carried out. A twenty-minute inhalation of 20 per cent. potassium ferrocyanide was given through a Spiess-Dräger atomizer. After twenty minutes ferrocyanide was present in the urine. The mucous membrane of the trachea was deeply stained for a few centimetres below the cannula, that of the main bronchi very lightly stained, and that of smaller bronchi not at all. At the bifurcations of the branches heaped-up stain was found. He concludes that the absence of staining in the smaller bronchi resulted from the very rapid absorption of ferrocyanide.

Kaestle,[5] using rabbits under chloroform anaesthesia, was able to stain the whole bronchial tree and the alveoli with ferrocyanide. Narcosis may have hindered absorption, and a different type of animal was used.

I. Sikorsky[6] caused dogs and rabbits to die from asphyxia as a result of the aspiration of sodium indigo sulphate; the trachea was immediately filled with absolute alcohol to precipitate the dye. Granules of dye were found between the cells of the bronchial epithelium, and streaks of dye were found in the peribronchial tissues. The cells of the bronchial epithelium were unstained. Sinkosky produced similar evidence. Heubner, using Victoria blue dye in olive oil, showed that oil drops passed between the cells of the bronchial epithelium, and that dye was absorbed from the oil drops by the bronchial epithelial cells. The dye was introduced into the trachea; eight minutes later the animal was killed. The lungs were kept in formalin for three days and examined in frozen section.

These experiments show conclusively that very rapid absorption occurs from the tracheo-bronchial mucous membrane, both for aqueous solutions and for those in which oil is used as a solvent. The depth to which atomized liquids penetrate the bronchial tree is very difficult to determine because of this rapid absorption. Most of the experiments have been carried out with an intratracheal cannula, but Hofbauer[7] allowed dogs to inhale through the nose and the findings were similar. Dye is found at the points of division of the bronchi, down to minute branches, and in some cases in the alveoli. In Heubner's tests the dyes used were malachite green and Victoria blue oil; the Spiess-Dräger apparatus and the Tancre apparatus were employed. The former apparatus produced the more dense vapour with larger drops and with it only were drops of dye found in the alveoli.

Clinical Investigation

Dr. L. S. T. Burrell was using a Collinson's inhaler in the wards of the Royal Free Hospital, and when I was his house-physician he asked me to carry out some experiments to show the degree and rate with which certain drugs were absorbed and also to give an analysis of the results of cases treated in the hospital. The effects of inhalation of pure oxygen were studied both on patients and on students. A gauge was used to determine the rate of flow of oxygen from a cylinder, and the dial controlling the supply of oxygen was set at different levels according to the amount of oxygen in the cylinder. If the oxygen were delivered at more than ten litres a minute there

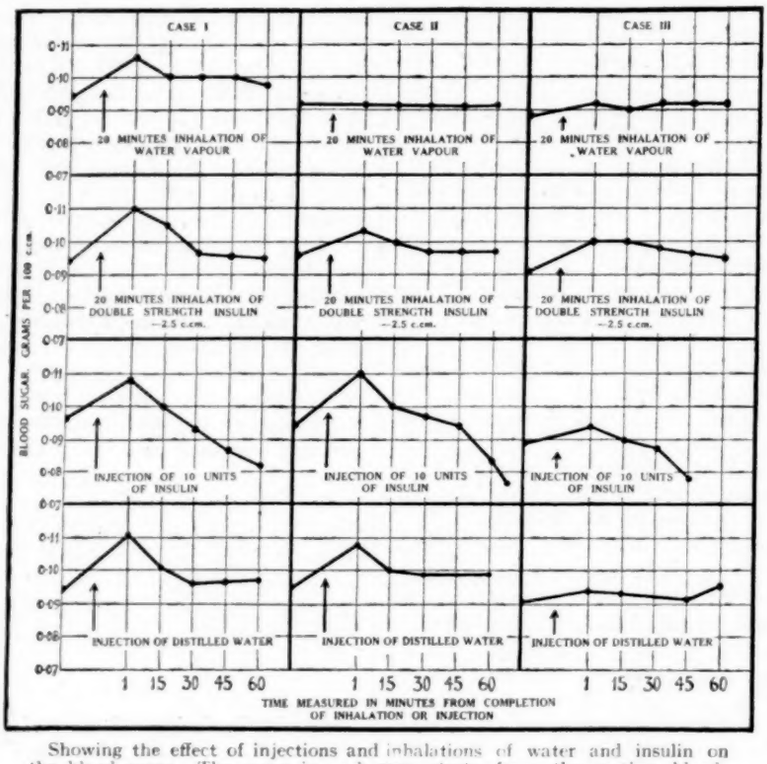
TABLE I.—*Comparing the Effect on the Blood Pressure of an Inhalation of Pure Oxygen through the Atomizer, and the same after a 1 in 1,000 Adrenaline Solution had been put into the Atomizing Flask*

(The inhalations were given to patients who had been resting in bed for many hours; the patients were not disturbed for the inhalation, and all had had previous practice inhalations.)

Patient No.	Atomizing Flask Empty		Blood Pressures					Atomizing Flask Containing 1 in 1,000 Adrenaline	Blood Pressures				
			Resting	Minutes of Inhalation					Resting	Minutes of Inhalation			
				5	10	15	20			5	10	15	20
1	Litres of Oxygen a Minute	5	138/84	140/84	140/84	140/84	138/86	Same Oxygen Rate: Same Patients	140/84	140/84	140/86	140/86	142/86
2		5	112/72	112/72	110/72	110/72	110/72		110/72	110/72	112/72	112/72	110/72
3		5	118/72	120/72	120/72	120/72	122/72		118/74	118/74	118/74	120/74	118/72
4		5	108/68	106/68	106/68	108/70	106/70		110/68	110/68	112/68	108/68	110/68
5		5	164/86	164/86	164/86	162/86	162/86		166/86	168/86	166/86	166/86	166/86
6		8	154/84	154/86	150/86	148/86	148/86		152/84	152/84	152/84	154/84	152/84
7		8	210/92	214/94	210/94	208/92	204/92		216/94	214/94	216/94	214/94	212/94
8		8	118/70	118/72	116/72	110/72	108/72		116/72	116/72	114/70	114/72	112/72
9		8	122/76	120/76	120/74	118/74	114/74		122/78	124/78	120/78	120/76	118/76
10		10	148/80	148/80	146/80	144/80	140/78		146/82	146/80	144/80	144/80	144/80
11		10	164/84	166/84	164/84	160/84	158/84		170/84	170/86	168/84	166/84	166/84
12		10	114/72	114/74	110/74	108/74	104/74		114/74	114/74	114/74	110/74	110/74
13		10	98/70	100/70	96/68	92/68	86/68		100/70	110/70	98/70	96/70	96/70
14		10	124/72	122/74	120/74	116/74	114/74		124/76	124/76	122/76	122/76	118/76
15		12	246/108	244/110	240/110	138/110	134/110		240/106	242/106	240/106	240/108	238/108
16		12	196/104	196/104	188/102	186/102	186/104		198/104	196/102	192/102	194/102	190/104
17		12	116/76	114/76	112/76	108/76	104/76		118/76	116/76	116/76	114/76	110/76
18		12	132/74	130/78	128/78	124/78	116/78		130/78	130/78	128/78	124/78	124/78
19		14	146/84	144/86	140/86	138/86	132/86		140/86	146/86	140/86	140/86	136/86
20		14	128/80	126/80	120/80	114/80	112/80		128/80	128/80	126/82	124/80	120/80
21		14	112/78	110/78	106/78	98/76	94/76		110/78	110/78	104/78	102/78	98/78

was a steady fall of systolic blood pressure; the diastolic pressure often showed a slight initial rise, but was usually not much altered. The pulse pressure was decreased in many cases. As the flow of oxygen was increased the fall in systolic blood pressure was often increased; symptoms of giddiness were not uncommon with oxygen rates of twelve and fourteen litres a minute.

If the oxygen were passed through an atomizer as before, but a 1 in 1,000 adrenaline solution was put into the flask, the fall in blood pressure with oxygen rates of eight, ten, and twelve litres a minute was reduced; there was no change noted in the blood pressure findings at lower pressures from those in which pure oxygen had been used.



Showing the effect of injections and inhalations of water and insulin on the blood sugar. The curve in each case starts from the resting blood-sugar level.

The adrenaline was replaced by 40 per cent. potassium iodide solution. A student inhaled the atomized potassium iodide for ninety-five minutes with an average oxygen rate of 4.5 litres a minute (varied six to four litres one minute). Iodides were not found in the urine. No symptoms followed. The systolic blood pressure fell from 112 to 104 mm. of Hg. A second student inhaled iodides for forty-five minutes with an average oxygen rate of 10.5 litres a minute. No trace of iodide was found in the urine at the end of the inhalation; blood pressure readings have been lost. Rough attempts to find iodides in the blood with starch solution and hydrochloric acid failed. A third student inhaled iodides for twenty-three minutes with an average oxygen rate of 14 litres a minute. The inhalation was stopped, since the student complained of giddiness. The systolic blood pressure had fallen from 116 to 98. About 0.25 c.cm. of solution had been used. No trace of iodide was found in the urine; there was slight nasal catarrh the following day.

These experiments were repeated, both on students and on patients. Two patients were found to have traces of iodide in the urine; it was later discovered that they had been taking iodides medicinally before admission to hospital, in both cases within two weeks of the test.

Having failed with iodides to produce evidence of their absorption inhalations of insulin were used. Tests were

made at 7 a.m. with a fasting blood sugar and at 5 p.m., no food being taken after 12 noon. Each student was given an inhalation of water vapour and one of insulin; each inhalation lasted twenty minutes, and the rate of the oxygen flow was 10 litres a minute. It was found that approximately 2.5 c.cm. of concentrated insulin (10 units) had disappeared from the flask during each inhalation; each student was therefore given 10 units of insulin by injection and an injection of a similar volume of water. Readings were taken by estimating the blood sugar immediately before and immediately after the inhalation or injection and every quarter of an hour for one hour afterwards. It was found that ten units of insulin by injection lowered the blood sugar within the hour. Inhalation of insulin usually produced a curve similar to the curve after inhalation of water vapour: in two cases the blood sugar remained slightly raised. Students were not informed whether insulin or water was being used.

If drugs are to be given by inhalation to produce general effect an inhalation of over twenty minutes' duration is not practicable. With a flow of oxygen of 10 litres a minute about 2.5 c.cm. of liquid are removed from the flask. If a therapeutic dose of a drug is to be given it must, in many cases, be in very concentrated form. Under the condition of the experiments described it was not possible to show that the drugs were absorbed. It appears that the size of droplet judged suitable for penetration deep into the bronchial tree has been calculated on the basis of animal experiments. Aqueous solu-

TABLE II.—*Twenty Patients Treated by Inhalations*

Series No.	Age	Sex	Disease	Treatment	Result
1	29	F.	Asthma and bronchitis; some emphysema. Winter bronchitis since childhood. Asthma for 3½ years, associated with attacks of bronchitis and increasing in severity	Apnengene and camphengene inhalations 5 min. each. Increased to 10 min. each for 2 weeks. Creosote and camphengene 1 week	Some relief during attacks of asthma from apnergene. Camphengene stimulated deep breathing and was useful as form of breathing exercise. Cure did not result and recourse was had to iodides, etc. Final result great improvement
2	19	F.	Status asthmaticus. Severe bronchitis 3 years before. Asthma since, often very severe. Not necessarily associated with bronchitis	Apnengene and camphengene—30 min. inhalation of apnengene; 5 min. inhalation camphengene	Apnengene at first relieved attacks, later failed completely. Slight relief, some increase in respiratory exercise; pulse volume increased
3	46	M.	Asthma and chronic bronchitis. Recurrent bronchitis since winter 1934-5. First attack of asthma spring, 1935, increasing in severity and frequency	Apnengene and camphengene 2 weeks, followed by iodides and colon irrigation	Relief of asthma: no change in bronchitis. Final condition much improved
4	18	F.	Asthma	Apnengene and camphengene 3 weeks	No asthma while in hospital. Recurred after discharge
5	61	M.	Asthma and pulmonary fibrosis. Worked in sawdust for 50 years. First attack of asthma followed pneumonia at age of 35	Apnengene and camphengene 2 weeks; apnengene and creosote 1 week	No improvement. Other methods of treatment were used after 2 weeks
6	46	F.	Asthma for 32 years; bronchitis every winter for 20 years. Persisted throughout the last summer	Apnengene and camphengene, apnengene and pine oil, apnengene and creosote, camphengene	Very definite clinical improvement. No change in *x*-ray appearances. Recurred after discharge; no permanent improvement
7	69	M.	Asthma and bronchitis each winter for 5 years	Apnengene and camphengene 2 weeks. Other forms of treatment were then used with inhalation therapy as above	No change. Improved. Final *x*-ray, no change
8	34	F.	Chronic bronchitis and emphysema. Insidious onset during last 7 years	Inhalations as in No. 6	Improved. Improvement maintained throughout the summer. Bronchitis cleared
9	58	F.	Chronic bronchitis and emphysema. Cough since pneumonia 9 years previously	Apnengene and camphengene 2 weeks; iodides, gr. 10 added. Inhalations continued	No change Improved
10	60	F.	Pulmonary fibrosis, and congestive heart failure (chronic)	Camphengene 5 min. b.d.	Pulse improved; respirations deepened; cyanosis decreased. Cough followed with free expectoration. Cyanosis returned in 5–20 minutes
11	52	M.	Bronchitis and acute congestive failure. Auricular fibrillation. On recovery from the acute congestive failure crepitation remained, with poor air entry at both bases; lung condition remained stationary for 2 weeks	Camphengene 10 min. b.d.	Lung bases clear of crepitations after 3 days
12	68	M.	Recovering from congestive heart failure. Crepitations at right base persistent and unchanged for 3 weeks	Camphengene 10 min. b.d.	Right lung base clear of crepitations in 5 days
13	61	M.	Cardiovascular degeneration. Bronchiectasis	Camphengene 10 min. b.d.	Appeared to make expectoration less difficult
14	76	F.	Myocardial degeneration; congestion of lung bases; cyanosis +	Camphengene 10 min. b.d.	Air entry and expansion at lung bases increased. Cyanosis decreased
15	48	F.	Pulmonary fibrosis; chronic bronchitis; cough and purulent sputum for 4 years. No evidence of bronchiectasis (lipiodol). Haemoptysis 5 weeks previously	As No. 6. After 2 weeks iodides gr. 10	No improvement in first two weeks. Much improved at time of discharge; sputum decreased in amount. Improvement maintained throughout the summer
16	36	F.	Chronic bronchitis 10 years. Tubular bronchiectasis left base behind heart	Camphengene 5 min., creosote 10 min., b.d.	Appeared to aid free expectoration if given before postural drainage
17	52	F.	Bronchitis all year round since childhood. Bronchiectasis at right base	Camphengene and creosote as in No. 16	Appeared to assist expectoration if given before postural drainage
18	48	F.	Winter bronchitis 15 years. Bronchiectasis at right base	As No. 16	No improvement
19	39	M.	Bronchiectasis 16 years	As No. 16. A stronger solution of creosote—40 per cent.	Complained of pain in the chest after inhalations. A brisk haemoptysis followed an inhalation
20	45	M.	Silicosis; bronchitis; no tubercle bacilli found. Copious sputum	Apnengene and camphengene; camphengene and creosote	No change; sputum not reduced in amount

tions and solutions in oil are apparently well absorbed in particles of this size in cats and dogs. If suitable conditions are found and absorption of drugs by the tracheo-bronchial mucous membrane is effected two great difficulties remain:

1. To give a therapeutic dose of a drug in an inhalation of moderate length.
2. To measure exactly the dose given.

Local Action

In the case of animals it has been shown that solutions in oil and water passed through a suitable atomizer, such as the Spiess-Dräger, are immediately absorbed. The droplets are deposited in a very fine spray over a great area, and it is unlikely that there will be injurious concentration on the tracheo-bronchial mucous membrane. It does not seem likely that drugs given for local action will therefore have sufficient time to produce any effect.

In view of the experiments with iodides and insulin on students doubt was felt as to whether the atomized liquid penetrated the tracheo-bronchial tree. Twenty-minute inhalations of 5 per cent. cocaine were given, the subject breathing alternatively through the nose and the mouth. It was impossible to demonstrate any diminution of sensation in the mucous membrane of the tongue, palate, fauces, post-pharyngeal wall, and nose, although these were rapidly tested as soon as the inhalation ended. The pupils, however, dilated; and there was complaint of a dry mouth and thirst.

Therapeutic Application

A small series of twenty cases of pulmonary disease were treated by inhalations. A Collinson inhaler was used. The rate of oxygen throughout was 10 litres a minute. A five-minute rest period alternated with every five minutes' inhalation. The length of a single inhalation totalled twenty minutes, and treatments were given twice a day. A record of results and a summary of the cases are given in Table II.

Analysis

Of seven cases of asthma two were completely relieved during attacks; the asthma attacks ceased. In one of these cases attacks recurred at once after discharge. One patient gained relief from earlier attacks while in hospital, but was later unaffected by inhalation. One case, given inhalation on admission, had no attacks while in hospital. Attacks occurred immediately on discharge. Three were not improved. In a twenty-minutes inhalation of apnengene, which contains adrenaline in strength 1 in 1,000 only, 0.35 to 0.4 c.cm. of solution is found to be atomized. Some of this probably escapes through the respiratory valve unabsorbed.

Of nine cases of chronic bronchitis two improved. In one case the improvement has been maintained throughout the summer. The other case rapidly deteriorated again after discharge.

Of five cases of bronchiectasis postural drainage was accelerated in four after inhalations.

In two cases of recovering congestive heart failure crepitations and diminished air entry at the bases were rapidly improved with camphengene inhalations. Subsequently camphengene was given by routine to all such cases, with improvement.

Conclusions

1. No evidence was obtained of the absorption of potassium iodide.
2. No evidence was obtained of the absorption of insulin.
3. Evidence was obtained of some influence of adrenaline on blood pressure when inhaled.
4. Inhalation of oxygen at a rate of 10 litres or more per minute led in most cases to a fall in blood pressure.
5. Evidence was obtained suggesting that inhalation of medicaments was of value in cases of chronic pulmonary congestion, but the results of treatment of a few cases of asthma and bronchitis were unsatisfactory.

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THE PHYSICAL WELFARE OF YOUTH

BY

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The questions of physical education and physical recreation are now much in the public mind. It seems desirable, therefore, that inquiries should be made into some of the factors which underlie a satisfactory conception of the issues involved. There is a tendency to forget that education and recreation are not ends in themselves, but parts of a total situation which is best comprised in the term "creative living." Nothing could be more fatal to the success of any scheme than an attempt to effect a division of the subject into watertight compartments.

An acknowledged authority on physical recreation recently suggested that a system of incentives was necessary if youths and young men were to be fired with the requisite enthusiasm for physical culture, and he proposed that the medical profession should lay down agreed standards of physique to which the male youth of the nation could aspire. On reaching the decreed stages of perfection they might then be allowed to distinguish themselves by some agreed title.

The Need of Incentives

The objections to some such arbitrary standard are not so obvious that they can be ignored, for if it is true that in the case of girls the operation of an incentive is undoubtedly responsible for a greater partiality to physical culture it might therefore be assumed that with youths something similar would be effective. The female regards beauty as an end in itself, possessed of very definite economic and biological advantages. The male on the other hand, at least in the industrial West, appears to regard the quest of bodily perfection as of considerably less importance, except in so far as athletic prowess is concerned, and he does not acknowledge that he owes it to himself, to his mate, and to the community to see that he develops his whole personality to the fullest. The incentive that operated in ancient Greece and Rome is lacking in large sections of our population to-day, and it is desirable that we should inquire how we may best create the quest of the beautiful that was once so potent along the Mediterranean coast. How can we most surely and effectively work towards realizing the ideal of a regenerated and upstanding people?

If incentives are needed, and it seems that they are, is there any other field in which to find them? Some suggest that national pride is adequate; others would invoke the objective of international contests in games and of sporting events in the air. The military aspect has been advanced, and a prominent soldier has even remarked that organized camping should be fostered with the dual aim of improving youthful health and military recruiting. However one may regard each of these suggestions they can at most affect a small minority—an elite—which would assume the role of potential gladiators

to entertain the passive majority. In questions of national health and well-being we are not concerned, or should not be concerned, with minorities, but rather with the great mass of youth, male and female, who not only have their own lives to live but who in the years to come will be the fathers and mothers of generations yet unborn. We have to consider the fitness of a people. Such fitness cannot be tested by any doctor, by special skill in any one sport, or by arbitrary standards, but only by the supreme test of mental and physical performance over the whole span of life. If this be our aim we are concerned with the whole man—with mind as well as body—and we cannot, if we would, remove individuals from their environment for special study. It is a case of the total situation or nothing, but before we turn to incentives and tests we must review the material to be tested or stimulated. Any gardener knows that you cannot raise a good plant from poor seed or from poor soil. If left alone, it makes a poor show; if forced, it withers early. To do any good in producing a fit people the environment and nutrition must be dealt with before there is any consideration of increasing physical effort. Once these two fundamentals are attended to much of the necessary incentive will spring from the *vis naturae* within each one of us.

Essentials of Good Nutrition

The greatest difficulty in assessing the physique of young people is to determine their state of nutrition. There are many proposed standards, but none is infallible. It is well known that the new armies in the last war showed marvellous stamina, but they had first-class rations to repair previous deficiencies. There would have been a different tale to tell had the troops been fed in war time exactly as they were fed in their own homes. There are good grounds for believing that very large sections of the people of England are inadequately fed. In the first place the organization and preparation of meals is sadly divorced from the physiological needs of those who eat them, so that, even where money is adequate, diet may be defective. Then there are thousands of homes where incomes are not sufficient to provide even the basic minima laid down by the B.M.A. scale. This has been demonstrated by the Committee against Malnutrition and by reports from areas where employment is scarce. Further, a large group of people take their meals in public places, where money adequate for home feeding fails to provide the necessary nutrition and is spent rather on providing a sense of repletion by the aid of excessive carbohydrates. Official complacency would have us disregard certain of these factors, especially if they involve spending additional public money, but no review of nutritional standards is of much value if it ignores the widespread defects in cooking what might otherwise be an adequate diet.

The domestic side of the problem reaches further than at first sight appears. The planning of housing estates could with great advantage be modified to allow of certain regional cooking arrangements, at least for the main meal of the day. A great deal of domestic drudgery could be eliminated by the community kitchen. Women in working-class homes have to spend far too much time in merely preparing and clearing away meals. Some relief is obtained by the use of tinned or pre-cooked food, but the general level of dietary suffers where its preparation is excessively tedious. The result is that food preparation is not at all in line with biological needs, and cannot be made so unless we are prepared to consider new methods. Much depends on the creation of the demand. The idea of the home as a place of recreative living will only dislodge the present acceptance of never-ending toil when people are educated to demand it. The cause of good feeding certainly stands to gain much, for it has little enough to lose, and should be a prime consideration in town planning for the future.

It is not possible to apply a wise system of extensive physical culture to a poorly fed body of youth, and despite many superficial indications to the contrary there is little doubt that only those who really feel fit for it are disposed to indulge in much physical exercise beyond that necessary for earning a living. Even in the economic sphere much poor health and poor work is due to defective nourishment. Before we consider other aspects of physical culture we must face the realities of nutrition. Where the means exist for supplying additional milk, cod-liver oil, and even food to young people who appear listless, the resulting increase in health and vitality supplies the answer to any doubts. Numbers of these listless youngsters would pass superficially as adequately nourished.

Then comes the question of sleep. The loudspeaker has not helped in this direction, and the B.B.C. might with advantage broadcast from time to time reminders to parents and others that children must be allowed proper and undisturbed sleep. When we have faced these fundamentals, which are social problems of the first importance, then and then only can we initiate a national scheme of physical culture.

Preliminary Steps

Meantime there are certain things which can be dealt with as a preparatory contribution towards a full solution. A general scheme of planning is needed for the use of recreation grounds, which should be open all day on Sundays without any restrictions. Men and boys should be encouraged to play games in shorts without shirts. The conventions of flannel trousers and shirts for tennis and of anything more than slips for bathing should be discouraged. The contact of moving air on the skin is an even greater general tonic than actual exposure to direct sunlight. Hard tennis courts should replace grass, and industrial concerns might be urged to support community sports clubs which could be open seven days a week instead of running their own private clubs, except where no other facilities can be provided. Boys and girls at school should learn early the delight and benefit of playing their games as near to the nude as possible. Many may still object to this, but so long as the objection is upheld the cause of physical fitness will languish except among the enthusiastic minority. Extensive bodily exposure when atmospheric conditions permit is the ideal for all sports, games, and physical training; the sooner we reach it and the nearer we reach it, the happier and healthier shall we be. Only the quest of the beautiful and the competitive element between individuals will supply the really vital incentive to care for the body and to seek for full health. Beautiful bodies are not of much use under layers of clothes, and it remains a fact that in some girls' schools the pupils still wear more for "gymnastics" than they do for ordinary daily work.

An Ordered Sequence

At the back of any scheme of physical education there must be an ordered sequence of events from earliest childhood right away to old age. Men and women and young people need biological understanding, not limited as some think to questions of procreation, nor yet too academic, but sufficiently related to reality and yet comprehensive enough to help everyone to grasp the essentials regarding their place in the scheme of nature. This links the plan of physical culture with education on the one hand and with "constructive medicine," as Lord Horder so well calls it, on the other. Biology in schools is often confused with nature study. To learn about plants and birds and hedgerows is delightful and valuable, but what is urgently necessary is deeper understanding of the very elementary facts of physiology. Domestic science, cookery, and dressmaking classes only have real value if there is a grasp of the elements concerning the bodily functions which these matters subserve. Games, physical exercises, and sport in general must be linked up with some vital knowledge of the why and wherefore of physical reactions. That a dozen girls, taken at random, who had passed the London matriculation examination, and were considered by their parents as educated, should confess to absolute ignorance concerning the elements of human digestion is a serious reflection on much that even now passes as education. We are still turning out annually

from our schools thousands of children who in the realm of things that most matter are actually illiterate.

Young people are wisely looking for every possible means to reduce domestic necessities to an ordered and irreducible minimum, and girls rarely get any experience in housekeeping till they set up a home of their own. The new attitude to home life places a premium on the tin-opener; hence it is all the more necessary to know what tins to open. Both girls and boys should learn to cook attractive, nourishing, and simple meals. Both sexes ought to have as wide a physiological knowledge as their intellects permit, and if the school curriculum is too full certain academic subjects will have to give way. Good diction and singing are valuable adjuncts to self-discipline, and well-modulated voices uttering correct speech are as important as sound limbs effecting a graceful carriage.

Unless we place the physiological background of life on a sound basis at school we shall soon have a generation of potential parents who hate domestic life simply because they do not understand it, cannot co-operate in conducting it, and finally undernourish themselves and their children owing to sheer incompetence. Home life at its fullest and best need not be drudgery, but it can only become vital and creative if every child at school is given the necessary physical education, which applies to the environment just as much as to the body.

Many points could be elaborated, but this much suffices to show that, good as sporadic efforts at physical training may be, they lose their value by being either too isolated from the general stream of hygiene and culture or too neglectful of the basic fundamentals. Only a nation-wide scheme taking root in the schools, and embracing social hygiene, medicine, sport, and other forms of recreation, nutrition, and the improvement of domestic functioning can give us what we need. Let us start first at the unspectacular but necessary foundation so that in due time we may reap a rich harvest.

Aims of Physical Education

The youth movements of the Continent, especially in Germany, Italy, and Russia, lay great emphasis on organization. This is undoubtedly needful in the educative side of the work, in the laying of foundations, and the promoting of a conscience in respect of hygiene, but on the actual recreative side it is vital to allow youth a sufficiency of individual freedom lest we fall into the error of so mechanizing physical activities that in the process of building the beautiful body we damage the mind. The mind illuminates the body, and the search for fitness must be directed with a full realization that only in so far as we have a nation of courageous, free-thinking, freedom-loving people can we hope to maintain, let alone advance, the ideals of beauty that once flourished in Greece yet perished centuries ago because the people who held those ideals lacked the power of constructive social thought.

There is much confusion regarding the terms physical training, physical education, physical culture, and physical recreation. Surely they are facets of the same stone, but it appears as though there is a desire in certain quarters to ignore the full consequence of this realization. The youth of industrial States like ours is much at the mercy of harmful influences operating in an atmosphere of boredom or cynicism. The desire to combat these influences has led many well-meaning people to evolve superficial and patchwork remedies which ignore the fundamentals. Youth can be exploited just as easily by well-meant as by harmful influences, and some of the proposals for physical recreation give the impression of being conceived mainly with an idea of just keeping young people out of mischief. This is a negative ideal, and is doomed to failure. Then again political motives of a certain type seem to aim at keeping young people content with the *status quo* merely by removing the more glaring instances of bored idleness, while some people think that by exercising the body the mind can be kept inert, and this they regard as desirable.

Physical education in its fullest sense, however, opens up new vistas of life and gives a new outlook on the world. It is a theme running through the whole educative process, and is hostile not only to a too narrowly academic or vocational type of education but also to any social system which fails to develop to the fullest extent the potentialities that exist for a full life. Much of the ideology behind the renewed interest in physical development ignores this or, if not ignoring it, seeks to pacify and even quell the questing spirit of youth. The heroes of the modern world are courageous innovators armed with knowledge, health, and vigour. They represent the hope of the future. Innovation, however, is harmful and useless unless it aims at creative ends and is guided by an inner discipline based on tolerance and culture. Such a discipline can be fostered by a proper understanding of the functioning of body and mind in the natural world. Hence broad elementary biological teaching is essential as a foundation of physical education. Let us realize that physical education is neither a stunt nor a "subject." It is a theme that must run right through the whole of the preparation of life and the living of it.

New Ideals for Old

The grave question of backward children and the related problem of juvenile delinquency is closely connected with the present topic. Proper nutrition, proper social surroundings, and proper understanding of the underlying facts are most likely to receive the attention they deserve from a people in serious search for beautiful and healthy living. The proper functioning of our complicated economic life demands that the utmost be obtained from every individual, and new ideals must replace the old if this is to be attained.

At all costs narrowness of view must be replaced by a broad biological outlook; in discussing physical education, recreation, or training man must be looked on as a biological entity with roots in the past and tendrils stretching out to the future. The total situation demands recognition, and thus social environment, physical surroundings, and mental atmosphere must all be placed in their correct position as parts of a coherent whole. Only in this way can we build a healthy nation. Piecemeal, short-sighted patchings, forcings, and evasions will not only fail to produce what is desirable, but may even play into the hands of those who are not devoid of ulterior motives in their handling of the problems of youth. Bored youth, disciplined to keep it quiet, exercised beyond its physiological means, and encouraged to find its psychological outlets in organized endeavour which stultifies individual thought, is just the soil from which in years to come a mentality will be fostered which may lead us towards war rather than towards a creative and enduring peace. Rightly developed, physical education can do more than any other single factor to lead us over and beyond nationalism towards a true brotherhood of man, making the utmost of the conquest of nature through the agency of virile, independent minds enshrined in healthy, vigorous bodies. Once mankind has learnt to value human loveliness, it will hesitate to turn its energies to destruction, mutilation, and death.

D. P. Bowe and D. C. Wakeman (*Journ. Amer. Med. Assoc.*, August 22nd, 1936, p. 577), who report a personal case, state that, although there is an abundant literature on tularaemia, there has been no careful study of the disease as a complication of pregnancy. Their case was that of a woman, aged 40, in the fifth month of pregnancy, who contracted a mild attack of ulcero-glandular tularaemia from skinning a rabbit. The apparent effects on the course of pregnancy and parturition were a moderate hypochromic anaemia and uterine bleeding, probably due to extensive placental infarction before the onset of labour. The infant showed no signs of disease, apart from agglutinins in low dilution (1 in 80). The post-partum course was uneventful.

TREATMENT OF INTRASELLAR TUMOURS BY RADON

BY

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In a case of intrasellar adenoma the first complaint is usually of ill-defined eye trouble ; the fields of vision are examined and a scotoma assuming hemianopic form is found. In women amenorrhoea commonly precedes the changes in the visual fields by several years ; scotometry should be included in the routine investigation of this abnormality. An alteration in the features, which are becoming leonine, denotes an early stage of acromegaly. The patient is referred for *x*-ray examination ; an enormous dilatation, out of all proportion to the mildness of the symptoms, is revealed. This is the syndrome to which the following observations apply.

To implant radon seeds by means of the orbito-nasal route is easy, and may prove more effective than an abortive attempt to remove either a very large or a malignant tumour. The appearance in a skiagram of a calcified wall of a suprasellar cyst would be a contra-indication ; one must make a careful selection from the larger intrasellar growths. Contributions to which references are given below show that the methods to be discussed have passed beyond an experimental stage.

Surgical Anatomy of the Paranasal Route

What room can be made between the orbital fascia and the mucoperiosteum of the nose?

The inner walls of the two orbits are parallel, and the width between them varies with the interpupillary distance—for example, if this distance is two and a half inches the distance between the laminae papyraceae is about one and a quarter inches. The nasal passages are narrow ; the space is mainly occupied by the cellular lateral masses of the ethmoid. Partial resection of the latter can be effected submucously quite easily by working from the orbit. If the mucoperiosteum is torn in the spheno-ethmoid recess the opening will serve for drainage. Thus the sphenoid sinus can be reached by a unilateral or a bilateral excavation. The outer walls of the two orbits are at right angles to each other. This enables one to displace outwards the orbital fascia and its contents for nearly half an inch with the aid of a suitable retractor (see figure).

Orbital retractor.

A slowly growing adenoma expands the body of the sphenoid to a mere shell, and, unless the fabric is altered in this manner it is futile to attempt excochleation. One cannot practise upon normal skulls. Anatomical variations are frequent. The optic nerves may actually tunnel through the sphenoid sinus instead of passing through a normal optic foramen (Onodi). In acromegaly the air sinuses are large. From the internal canthus to the pituitary body is about the length of an index finger. Preservation of the olfactory sense is a consideration to be borne in mind. On the inner wall of the orbit an imaginary line connecting the anterior and posterior ethmoid foramina indicates the level of the cribriform plate.

Operative Technique

The nose is cocainized and the skin is infiltrated with novocain and adrenaline. Intravenous sodium evipan provides anaesthesia of suitable duration. The eyelids of the more defective eye are temporarily closed with a suture.

To avoid the angular vein I now make a median vertical incision down to the bone, and retract the periosteum and orbital fascia outwards. Usually the only vessel requiring tying is a transverse communicating venule which crosses the bridge of the nose, and the exposure is equally good for one or both sides.

Commencing beside the lachrymal sac, the inner wall of the orbit is removed, and the operation proceeds as described by Chiari. To obtain maximal exposure it is well to detach the pulley of the superior oblique muscle from the trochlear fossa. The muscle balance was tested with the Maddox rod a week later in one case and found to be normal. The patient should be warned that diplopia may persist for a few days. Division of the ascending process of the superior maxilla, so effective in giving the *coup de grâce* in frontal sinus suppuration, is unnecessary. The ease with which the objective can be reached, in the absence of inflammation in the sinuses, is remarkable. The use of antiseptics containing bismuth or other substances liable to set up secondary radiation is avoided.

The next step is to pick away the carapace of the adenoma, allowing it to prolapse from the base of the brain. Montmollin writes of the Chiari operation: " In a few dramatic cases we have witnessed from the moment of incision of the dura mater a sort of physiological birth by intracranial pressure." The dangers of undue interference with such processes are well known. Aspirate, or inject radon seeds by all means, but do not attempt removal unless conditions appear exceptionally favourable. This is my opinion at present. The straight incision supported by the bridge of the nose is easy to close with perfect apposition, and soon becomes inconspicuous.

Insertion of Radon Seeds

The seeds can be inserted either at the time of operation or later in the *x*-ray room ; the former is the safer plan. The line runs from the region of the inner canthus towards the external occipital protuberance. The external auditory meatuses are the best fixed points for measurements. When the needle touches the dorsum sellae there is a gritty sensation which is unmistakable. Any dorsum sellae containing sufficient lime salts to show in a skiagram can be felt with a blunt needle. If there is no dorsum sellae the case is probably one of internal hydrocephalus or of suprasellar cyst, and unsuitable for treatment by radon.

X-ray examinations are indispensable. Stereoscopic shift should be one inch for every ten inches of tube distance. The tinfoil embedded in film cartons can be fixed by seccotine to the skin between the surface landmarks. With the aid of stereoscopic films or coloured anaglyphs one can almost rehearse the operation in three-dimensional optical projection. An alternative plan is to solder the seeds to phosphor bronze wire, a method successful in the treatment of tic douloureux.

Those who prefer to use radium itself should consult contributions to which reference is given.

Dr. Chester Williams of Bradford kindly assists me with these operations, bringing radon seeds. The irradia-

tion causes a loss of cells from the glandular area, the acini becoming almost empty and the stroma compressed. Interstitial radon appears to me as suitable a mode of irradiation as any that is available at present for combination with a decompressive operation of access.

Illustrative Case

The rapidity of restoration of the fields of vision in the following case (referred by Dr. Priestley of Leeds) was in striking contrast to their insidious restriction.

A woman, aged 29, who had had amenorrhoea for eight years, complained of failing vision in April, 1934; R.V. 6/36, and L.V. 6/9. The temporal half of the right field was lost absolutely. The fixation point was spared. In the left field there was a temporal hemiopic scotoma for small test objects. The optic disks were pale. A skiagram showed a distended sella turcica, the posterior wall of which was reduced to an upright lamina.

With the co-operation of Dr. Chester Williams six radon seeds were implanted. The patient went home on the seventh day and found that while facing the fire she could once again see her husband sitting in his armchair on her right-hand side. A temporal island had reappeared in her left field of vision.

Further improvement occurred. The right field of vision became gourd-shaped and the left normal. The patient could look after her home and play tennis; when seen in July, 1935, she was setting off for a seaside holiday. In January, 1936, the vision of the right eye was 6/9 and of the left 6/5. Examined with the perimeter, both fields of vision were found normal, though with small test objects a temporal scotoma could still be demonstrated in the upper part of the right visual field. The pituitary facies was less apparent. On *x*-ray examination in February, 1936, Dr. Rowden reported that the radon seeds were more closely grouped together. He considered this to indicate that the tumour had shrunk. In June, 1936, the only complaint was of a slight increase in weight. Endocrine therapy was being considered. The patient felt well and energetic.

Summary

If the sella turcica has been so distended as to expand the body of the sphenoid to a shell, surgical access can be obtained by displacing the orbital fascia and contents outwards and removing the ethmoidal cells. Radon seeds can then be inserted. The operation is easy, and, although certain intricacies could scarcely be foreseen without experience, all but the final stage of the operation will be familiar to many readers.

In order to avoid the angular vein and to permit bilateral access if necessary, a median interorbital incision is recommended. A "teaspoon" retractor is illustrated.

A case of a woman able to play tennis two years after operation is described.

Chiari's operation has been practised extensively in Switzerland by Nager and his colleagues.

I confess that latterly I have been attracted back to the intracranial route. I do not exclusively prefer either method, but would choose whichever I thought held out the best prospect in any individual case.

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Clinical Memoranda

Rhythmical Agranulocytosis

This case is at present incomplete and is published now with the hope of suggestions as to investigation and treatment.

CASE REPORT

The patient, a married woman aged 43 years, came to me on October 6th, 1936, complaining of small ulcers in the mouth, accompanied by some feeling of malaise; there had been several attacks of a similar type recently. She stated that she was in perfect health except at the time when she had these ulcers; there was then a slight rise of temperature, between 99° and 100° F. (on one occasion 101° F.) and the slight feeling of malaise; no other disability was apparent. In 1919 and 1926 attacks of recurrent ulcers of the mouth, lasting for periods of some months, had occurred following a state of "poor health."

The present series appears to have started on July 25th of this year, when she had an attack described as influenza; seventeen days later this was followed (August 11th) by an attack of tonsillitis. No ulceration in mouth was noticed. On August 29th, eighteen days subsequently, ulcers in the mouth started, lasting until September 5th. A second crop of ulcers started on September 15th—a seventeen-day interval. This attack coincided with a menstrual period at which time she reports the ulcers are apt to be worse. The next attack started with an abortive ulcer on September 30th, with a full ulcer on October 4th—that is, after an interval of nineteen days. Abortive ulcers started again on October 19th, with the full ulcer on the 21st—that is, after a seventeen-day interval. There was a further abortive ulcer on November 6th, followed by an ulcer on November 10th—an interval of twenty days. The most recent ulcer was on November 29th—an interval of nineteen days.

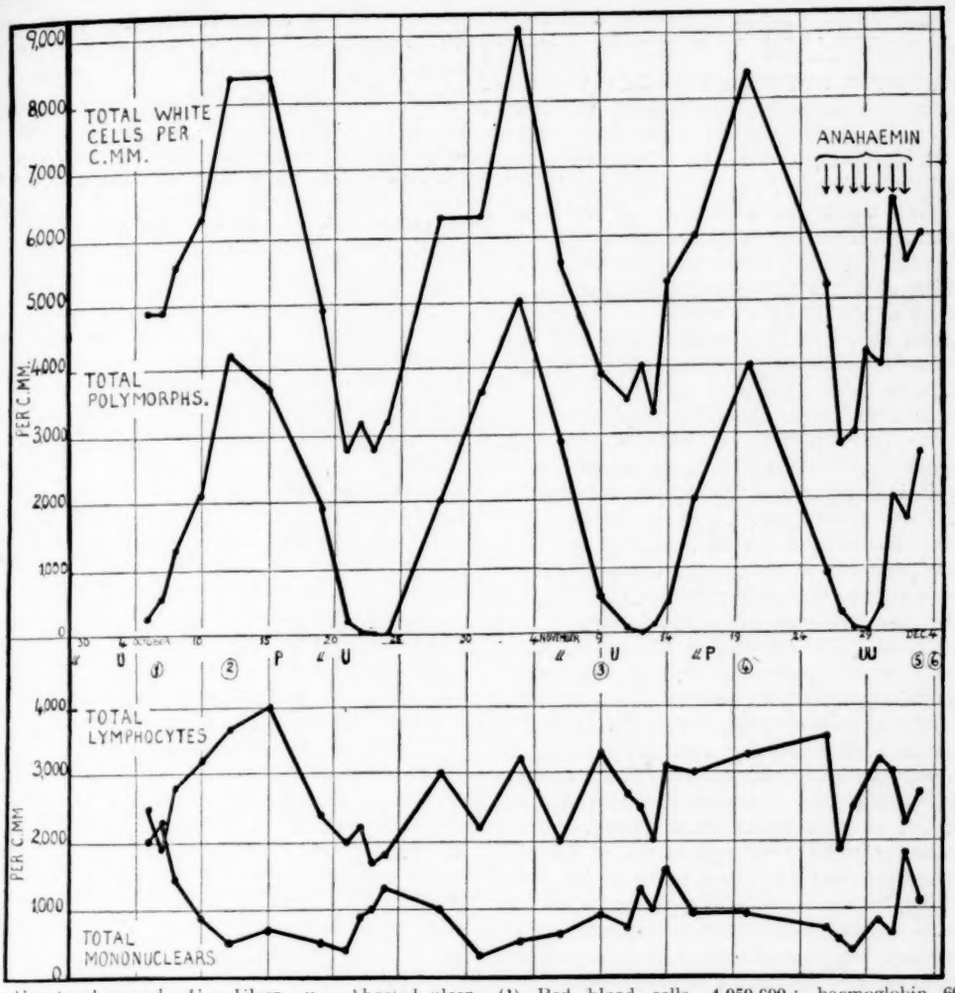
The ulcers are preceded by a burning, pricking sensation, but this may be felt without the actual formation of an ulcer. The sensation has also occurred at intervals between 1926 and the present attacks, occasionally a full ulcer having appeared. The ulcers are situated on the lips and cheek, never on the gums or throat. They may be from a pin's head in size to a half-inch in length. About the third day a slough develops, which separates, leaving a raw area. The ulcer is not tender unless touched until the slough has separated, when it becomes exceedingly tender. It clears up in about a week. Sometimes there is slight glandular enlargement associated with the ulcers, but not always. On examination no evidence of Vincent's organisms, moulds, yeasts, or haemolytic streptococci have been found.

At the period of maximum depression in the leucocyte count the red cells show marked vacuolation, numerous microcytes, some extremely small, and poikilocytosis, and the platelets become exceedingly numerous. At the height of the leucocyte counts there is little disturbance in the red cell picture beyond some vacuolation; the platelets are normal. The urine, blood urea, and blood sugar are normal; blood pressure is 142/84, and the teeth are satisfactory.

Before I saw the patient on October 6th no drugs at all had been taken for at least one month, nor any substance, as far as could be ascertained, likely to contain drugs. Ultra-violet rays had been used on the ulcers, and short-ray therapy. After the blood count on October 6th Blaud's pills (80 grains), three adexolin tablets, and one teaspoonful of marmite were given daily. On November 27th, as the bleeding time was found to be considerably prolonged, calcium and vitamin D were also given. The bleeding time was normal on December 2nd. Seven doses of 2 c.cm. anahaemin were given as shown on the chart.

Pentose nucleotide has not been used up to the present, as three of my previous cases developed exceedingly severe reactions, and as this patient lives in the country and refuses to go into a nursing home it was not felt safe to employ this drug.

As can be seen from the chart, the menstrual periods apparently bear no relationship to the rise and fall in the



P = Menstrual period. U = Ulcer. u = Aborted ulcer. (1) Red blood cells, 4,050,000; haemoglobin 60%. (2) 4,900,000; 54%. (3) 4,020,000; 72%. (4) 5,250,000; 80%. (5) 4,880,000; 78%. (6) 5,140,000; 74%. Readings subsequent to above graph: December 8th, white cells, 7,700; polymorphs, 3,927 per c.mm. December 10th, 6,300; 3,087. December 14th, 6,300; 2,079.

leucocyte count, in contradistinction to the connexion usually found in rhythmical cases. Peculiarities are:

1. The extraordinarily regular rhythm in the rise and fall of the leucocyte count (? life cycle of a parasite).
2. The lack of relationship to the menstrual periods.
3. The development of the ulcers before the complete drop in the leucocyte count has occurred.
4. The disturbance of the erythrocyte picture with the fall in leucocytes.
5. The remarkably good health enjoyed by the patient.

London, W.1. D. EMBLETON.

Penetrating Firework Injury

While I was acting as locumtenent at Hove recently a partner of the firm, Dr. H. J. Crawford, was called out to a youth of 20 who had been injured by the explosion of a firework. Apparently he had just applied a match to a harmless sort of firework lying on a table when there was a loud report and he felt a tearing pain in the right side of the scrotum. On examination a ragged wound was found on the anterior surface of the scrotum, in the floor of which the testis was visible: this wound was stitched.

The following day I was asked to see the lad, and on inquiring further into the history I was shown a small, irregular piece of glass which had been picked up at the time and might very well have caused the injury. The patient complained of considerable pain, and there was slight fever and anorexia. The right side of the scrotum was swollen, and there was some induration and marked tenderness. The wound was unhealthy, so I removed the suture, and a little brown serous fluid came out. I ordered fomentations two-hourly, and prescribed magnesium sulphate and analgesics, which later became necessary in increasingly large doses.

The next day the swelling was increased, and the patient complained of pain in the right inguinal region, which was very tender, but no glands were palpable throughout the illness. On the fourth day there was pitting oedema superficially, with underlying induration and exquisite tenderness most marked posteriorly. The general condition remained fair, but pain and insomnia became distressing. The temperature throughout ranged between 99° and 100° F. On the seventh day the scrotum was three times the normal size, but there were no signs of suppuration. There was uniform induration. The wound was closed and fomentations continued.

Two days later there was evidence of localization of pus at the lower pole, and drainage was decided upon. A general anaesthetic was given by Dr. Crawford, and an incision one and a quarter inches long made over the site of the pointing. A finger was inserted and several ounces of foul pus evacuated. The pus had a somewhat faecal smell and odour. The abscess cavity was very large, and appeared to be formed by the tunica vaginalis. The testis, greatly enlarged, formed the postero-internal wall of the cavity. To ascertain its upper limit I passed a finger superiorly and came upon a hard object occupying the posterior wall. On extraction with forceps this proved to be a firework casing 1¼ inches long by 1/2 inch wide and 1/8 inch thick.

It seems extraordinary that the explosion of a firework could cause a fragment of cardboard to penetrate trousers and shirt and enter the scrotum, to lodge finally against its posterior wall.

London. A. L. CRADDOCK, M.B., B.S.

Reviews

DIAGNOSTIC ROENTGENOLOGY

Since radiology is now recognized as one of the most important adjuncts in the diagnostic methods available for elucidating disease processes, books of reference and instruction have been called for, and in *Diagnostic Roentgenology*,[1] published under the editorship of Dr. Ross GOLDEN of Columbia University, we have one which usefully combines these objects. The editor rightly points out that the value of the *x*-ray examination lies not in the mere fact that a film has been made or a screening examination carried out, but in the experience and skill of the man who does the screening, who directs the making of the film and looks at it after it is made.

An *x*-ray film is a record of the differences in density in the part of the body through which the rays have passed. Diagnostic roentgenology is thus essentially a method of physical examination by which information obtainable in no other way can be secured. But this information must be applied to the clinical problem through the same processes of reasoning as those used for the information obtained by other means of physical examination. In the analysis of the shadows on an *x*-ray film there must be a recognition of any variation from the normal, which presumes that any artefacts are excluded and that abnormal shadows are interpreted from the standpoint of *x*-ray absorption. A further but essential step is a review of the various pathological processes which may be expected to cause these changes of density. It is here that training in medicine and surgery is required, as well as at least several months of intensive training under an experienced radiologist. A book and an *x*-ray apparatus alone make a dangerous combination in the hands of an inexperienced clinician. But a book such as that under review brings together within small compass the main facts of the subject and appeals therefore to the physician and surgeon as a profusely illustrated guide to the normal and pathological appearances, and to the radiologist as a useful index of what may be expected and obtained when patients with various complaints are subjected to the procedures indicated.

An expert has undertaken each section, and the method of presentation includes a clear description of the general and special technique required. The normal appearances and a representative selection of good radiographs of various disease processes are then described and illustrated. The sections cover all parts of the body to which radiology can be applied. About one-third of the book is given up to the well-known fields of lungs, heart, chest cavity, diaphragm, and digestive organs. The skull and paranasal sinuses, diagnosis of spinal cord tumours, and radiology of the urinary tract are well done ; while special mention should be made of the very full and up-to-date presentation of the *x*-ray diagnosis of diseases of the bones. Recently a good deal of work has been done on the definition of the lumen of uterus and tubes by *x* rays after injection of lipiodol ; the technique is simple, the substance itself appears to have no harmful effect on mucous membrane or peritoneum, and the diagnostic results are often valuable. In obstetrics also radiological investigation has led to advances.

The book may be recommended. The cost is high, but the production of such a work must be expensive. It is planned on a loose-leaf system, which presumably means that parts becoming out of date can be replaced without detriment to the remainder.

[1] *Diagnostic Roentgenology*. Edited by Ross Golden, M.D. New York: T. Nelson and Sons. 1936. (Pp. 854 ; 964 figures. 20 dollars.)

CHEMISTRY OF MILK

The Chemistry of Milk[2] is a subject embracing a very wide range of diverse aspects. Most books hitherto published under this title deal only with the technical aspects of the subject. Dr. W. L. DAVIES has sought to incorporate in this volume all the fruits of scientific research regarding the chemistry of the constituents of milk. These constituents are numerous, though it has been usual to treat them as few by grouping them under collective names. The chemical and physical properties of these constituents and the reactions and changes they undergo in different environments provide extensive matter for study. Scientific knowledge of the constituents of milk is abundant, but has remained hitherto for the most part scattered among contributions to different learned societies. Lactalbumin, lactoglobulin, and the other nitrogenous constituents of milk are here discussed independently. Enzymes and vitamins are adequately described, as well as types of fermentation and the resulting products. Considerable attention is also given to the occurrence of the important mineral elements in their various forms of chemical combination and in their relation to the nutritive value of milk. The occurrence and importance of calcium, copper, iron, manganese, phosphorus, and iodine are indicated and discussed. A chapter on the protein constituents of milk is particularly valuable. It enumerates the amino-acid structures which are constituents of the more important protein molecules, and it shows their relative abundance, as well as much other interesting matter. The technical processes of treatment of milk are described and discussed in their scientific aspect. This section includes such matters as homogenization, drying, and sterilization, and the advantages and defects of the different plans of treatment are described. A final chapter discusses the nutritive value of milk as a whole.

THE MEDICAL DIRECTORY, 1937

The ninety-third annual edition of the *Medical Directory*[3] for 1937 was published last week from the office of Messrs. J. and A. Churchill, and we welcome it with the certainty that, like those that have gone before, it will give us good service throughout every hour of the working day. An immense number of textual changes have been made as usual in the course of revision, but there is one large change which instantly strikes the eye: the first 350 pages, comprising the alphabetical list for London, have been reset with less spacing between the lines and wider and longer columns. This typographical change has effected a considerable economy of space—some fifty pages. The total number of pages of text and advertisements in the *Medical Directory* is now 2,343. According to the numerical summary on page viii (opposite the table of contents) the names number 58,751, being an increase of 657 over the figure for 1936. By far the largest part of this increase (468) has taken place in the Provinces, which now contain more than 25,000 medical practitioners. The entries under "Abroad" number 10,336, being an increase of 153, and there is a slight increase in the "Services" section. Ireland again shows a small drop, while the totals for London (9,097) and for Scotland (5,758) are almost identical with those for 1936. The "Late List" of new names, changes of addresses, etc., appears at pages 2221 to 2225.

[2] *The Chemistry of Milk*. By W. L. Davies, Ph.D., D.Sc., F.I.C. Vol. x. Series of Monographs on Applied Chemistry. Edited by E. Howard Tripp, Ph.D. London: Chapman and Hall Ltd. 1936. (Pp. 522. 25s. net.)

[3] *The Medical Directory*, 1937. London: J. and A. Churchill. (36s.)

MEDICAL GUIDE FOR INDIA

A large and expensive work of reference which has gone through four editions in fifteen years has found a public and presumably met a want, and this may be said of the *Medical Guide for India, and Index of Treatment*,[4] edited by Lieut.-Colonel E. J. O'MEARA, I.M.S., retired. First published in 1920, it was twice reprinted in the next two years, and subsequent editions followed in 1924, 1929, and 1935, each revised and considerably enlarged. The first 300 pages consist of an index of diseases and symptoms, in alphabetical order, with instructions as to treatment, and references to the more detailed directions in the separate sections which make up the other three-fourths of the book: therapeutics, dietetics, surgery, medicine, obstetrics and gynaecology, preventive medicine, and medico-legal work. Colonel O'Meara includes some notes by eminent members of the profession reprinted from English journals. A number of well-known Indian medical officers contribute to the different sections on their own specialties. Major-General A. J. H. Russell, Public Health Commissioner with the Government of India, writes of health organization in British India; Lieut.-Colonels H. Smith on eye diseases, H. Kirkpatrick on refraction, V. B. Green-Armytage on obstetrics and gynaecology in the Tropics, and R. N. Chopra on indigenous drugs of India. The book seems to be brought well up to date and likely to fulfil its purpose as a useful work of reference. The printing and general get-up are good. In the footnote on page 893 the word "exhumation" is twice misprinted as "exhaustion."

OTITIC HYDROCEPHALUS

Dr. ROBERT BOURGEOIS[5] has made an elaborate study of an uncommon sequela of otitis media, probably first recognized by Bárány about twenty-five years ago, and perhaps identical with the meningitis serosa described by Boenninghaus still earlier. More attention has been paid to it in recent years, and Dr. Bourgeois has collected some of the available literature and combined with it some personal experience in an essay on the condition which in England has been called "otitic hydrocephalus."

Dr. Bourgeois gives an elaborate description of the cisterns, the subarachnoid spaces, the circulation of the cerebro-spinal fluid, and the foramina which have caused so much doubt and perplexity to anatomists. This preliminary study is naturally essential to any proper understanding of the subject, but the description given suffers from the absence of any illustrations or diagrams, of which a few would have been an effective substitute for many words.

Much difficulty exists in the establishment of this condition as a clinical entity. It has to be distinguished from meningitis serosa, if the two are not identical; it has to be distinguished also from rapidly fatal cases of meningitis, so rapid that the stage of suppuration has not been reached; and the connexion with otitis media is sometimes remote and at least doubtful. Dr. Bourgeois insists repeatedly upon the importance of lumbar puncture and the examination of the cerebro-spinal fluid in making the diagnosis, but he does not give much attention to the non-suppurative encephalitis, which is a not uncommon intracranial complication of otitis media and causes much difficulty in the diagnosis from suppurative meningitis and cerebral abscess. There can be no doubt that at least some of the cases described as otitic hydrocephalus are cases of encephalitis and of its ultimate effects. Finally, the cases are rare and necropsies still more rare, and even when necropsy can be obtained the very act of opening the skull destroys much of the evidence of hydrocephalus at the moment when the intracranial pressure is released and the fluid balance between the various regions is altered.

In spite of all these difficulties Dr. Bourgeois, with French logic and clarity, describes three forms: an external diffuse form over the cortex, an internal form in which the cerebro-spinal fluid becomes encysted in the ventricles, and a localized form in which the fluid is encysted in the posterior fossa. The first two varieties are extremely rare, and it is doubtful if they occur apart from or as a sequel to meningitis or encephalitis in some form. The third form, though rare, is less uncommon, and the recognition of its importance is due to the clinical description of Bárány. Dr. Bourgeois has made a gallant and scholarly if not entirely convincing attempt to clarify one of the obscure problems of otology.

SCIENTIFIC RESEARCH

Until one has read far enough into *The Scientist in Action*,[6] by Dr. WILLIAM H. GEORGE, Royal Society Sorby Research Fellow and honorary lecturer in physics at the University of Sheffield, to get a clear idea of the author's general aim and point of view, the main impression received is that one is treading new ground and pursuing such path as there is with some difficulty. When, however, this purpose and outlook are apprehended, and one begins the book over again, the exploration becomes of great, almost fascinating, interest; and the guide reveals himself as a pioneer of clear vision and of great skill in enabling himself and his reader to find the way. The book is essentially an estimation of the methods and the value of scientific research, and a careful analysis of scientific method and outlook. One of its fundamental conceptions is that we cannot have scientific research without a researcher, and that, put crudely, the important relationship is not one between the results of research and something which is regarded as absolute truth, but between those results and the satisfaction of the scientific conscience of the researcher. Scientific research is treated, that is to say, as a problem of human action. Even in the most abstruse physical problems we do not get away from the observer.

It is correspondingly difficult for the reviewer to indicate briefly the scope and content of the volume. The research worker is regarded as engaged in two activities: first, the discovery of new facts; secondly, the arrangement of facts, old and new, into patterns. The earliest inquiry is, then, as to the proper nature and definition of a "fact"; and this is followed by the inquiry as to the proper selection and abstraction of facts from a miscellaneous heap, as to the nature and characteristics of "patterns," and as to the significance of scientific patterning, whether in classification, in the formulation of "laws," in the communication of a theory, or even in the conception of causal relationships. This, in Dr. George's hands, constitutes an extremely interesting and highly suggestive discussion, and leads to minor but essential problems, such as the reliability or the limitation of the eye-witness's observation, and the question whether the observation of relationships comes before or after the observation of parts or of individual facts. The discussion lends itself to illustration by concrete examples, and the author is not sparing of these, and uses them—physical, biological, or even literary—with great appositeness. Throughout he is concerned to insist that the

[4] *The Medical Guide for India, and Index of Treatment.* By E. J. O'Meara, O.B.E., Lieutenant-Colonel I.M.S. (ret.), F.R.C.S., D.P.H. Fourth edition, completely revised and greatly enlarged. Calcutta: Butterworth and Co. (India), Ltd. 1935. (Pp. 1,235. 25s. net.)

[5] *Les Hydrocéphalies Aiguës et Subaiguës d'Origine Otique.* By Robert Bourgeois. Paris: Masson et Cie. (Pp. 178. 32 fr.)

[6] *The Scientist in Action. A Scientific Study of His Methods.* By William H. George, M.Sc., Ph.D. London: Williams and Norgate Ltd. 1936. (Pp. 355. 10s. 6d. net.)

question science asks is always "How?" and never "Why?" or "Ought?" His final chapters deal with "Some factors in experimental technique," and with "The future of experimental research"; this is not, however, a book primarily for research workers, but for all those who wish to clarify their minds as to the scope of science as distinct from ethics or philosophy, the true nature of scientific method, the criteria of validity of a scientific theory, and the application of the results of research to human action. These are matters of great importance, and, though in reading most of the book close attention is required, this is well repaid by the consciousness of the reader that he has been helped towards a fresher, and in some respects a novel, appreciation of them by a remarkable exposition from an unusual standpoint.

A HANDBOOK FOR DRESSERS AND NURSES

A *Clinical Handbook*, compiled originally for residents, nurses, and students of St. Vincent's Hospital, Sydney, by members of the staff of the hospital, is of more than a local value. The second edition[7] now before us has been partly rewritten and brought up to date. The book provides in small compass, very clearly set out, just those directions and instructions for preparing and managing themselves and their patients which dressers and nurses need. The chapters on sterilization of hands, skin, and instruments, on preparation for various major and minor operations, and the principles to be applied in dealing with patients who are about to have a local or general anaesthetic or are recovering from an abdominal or special operation are valuable and essentially practical. Another useful part is contained in the sections on clinical pathology. The nurse's duty in securing suitable specimens is emphasized, and a short outline of clinical biochemical methods is included, sufficient to refresh a student's memory of the technique required. An interesting index of laboratory examinations shows, under alphabetical arrangement, the clinical syndrome and the appropriate pathological test and its interpretation. Sample instructions to patients are included, and the form for those taking insulin is a model of clarity. The calorific value of a diet is described, but no food tables are included. Tables giving the composition of foodstuffs as served would add to the value of the book. This would not increase the size or weight by much. It is just such a handbook that could be placed with advantage in every room where nurses, clinical dressers, and hospital residents congregate.

Notes on Books

Strange Places and Strange Peoples[8] is a further instalment of the reminiscences of Sir REGINALD ST. JOHNSTON, lately Governor of the Leeward Islands. Although he inclined to the Bar, parental pressure and a strong medical tradition in his family induced him to study medicine. He was a student at Birmingham when Jordan Lloyd was one of the outstanding surgeons, and he draws a vivid picture of this eccentric personality, with his auburn beard, "walking down the principal street of Birmingham with his top-hat on the back of his head, his frock-coat flapping in the breeze, a surgical bag slung over his shoulder in the crook of his umbrella, munching a ham sandwich as he strode along." St. Johnston entered the Colonial Medical Service, serving for some years in Fiji. On one occasion he was faced with a case of locked twins in a remote village in the mountains. No instruments were available, but with the aid of an old pair of broken shears and a length of fencing wire from a cattle pen he successfully performed the operation of "snaring, decapitation, and version." He soon became a commissioner-doctor and in 1914 achieved his ambition of being called to the Bar, which provided a stepping-stone to the higher rungs of the administrative ladder. The book deals chiefly with Fiji and the West Indies, and contains much interesting information. There is, however, an excessive tendency to digression, especially with regard to well-known people the author has met.

The first half of vol. vi of *Tabulae Biologicae Periodicae*[9] provides collected data on the physiology of sport and the chemotherapy of spirochaetes. The fundamental facts regarding the physiology of muscular exercise were very largely worked out in this country by A. V. Hill and his collaborators, and great attention has been paid to the subject in recent years in Germany. The article under review is by H. Herxheimer, and in it are brought together all the outstanding data concerning the effects of violent exercise on circulation, respiration, and metabolism. The article on chemotherapy gives collected data regarding therapeutic and toxic doses of 610 compounds whose spirochaeticidal properties have been measured on animals. A variety of other collected biological data are included in these parts. The examples given illustrate, however, the interesting character of the data provided. The rapid extension of scientific literature makes these volumes increasingly valuable, for they provide in readily accessible form information that would require months of work to hunt up in the original papers.

Mellor's *Inorganic Chemistry*[10] has reached the stage of the fifteenth volume. This deals with nickel, ruthenium, rhodium, palladium, osmium, and iridium. We have already described the nature and scope of Mellor's work in our notices of the earlier volumes. It would almost suffice here to say that the fifteenth has all the qualities of its predecessors, but it may not be inopportune to note for the benefit of any to whom the work is not yet well known that it is comprehensive to a degree, limited only by the records of research performed. The text contains the guiding facts and principles under their appropriate headings, and cross-references connect the statements, where necessary, with statements appearing under other subject titles in different parts of the book. The bibliographical references are an indication of the labour involved in the preparation of the work; they amount, in the chapter that deals with nickel, to a number approaching ten thousand, if not more. Thus if an inquirer desires to know the velocity of sound in nickel, the solubility of nitrogen in nickel monoxide, or any other piece of rare information he is happily placed if he is within reach of access to "Mellor." Something ought to be said, too, of the manner in which it is written. The details of information are so extensive that no index would be adequate for finding every item sought unless the index were nearly as large as the text; yet this is no cause of embarrassment, for the information is so placed that it is always easy to find.

A third edition of Dr. FREDERICK CHRISTOPHER's *Minor Surgery* has recently been published (W. B. Saunders, 42s.). At a time like the present, when changes and modifications in the curriculum of the medical student are subjects of such frequent discussion, it is well that the basic principles of the science and art of surgery should be enunciated with clearness and emphasis. Some of the hours spent in the operating theatre watching major surgical operations being carried out by the hand of a

[7] *Clinical Handbook. For Residents, Nurses, and Students.* Edited by Victor M. Coppleson, Ch.M., F.R.C.S., F.R.A.C.S., and Douglas Miller, Ch.M., F.R.C.S., F.R.A.C.S. Sydney and London: Angus and Robertson Ltd. 1936. (Pp. 205. 6s.)

[8] *Strange Places and Strange Peoples, or Life in the Colonial Service.* By Sir R. St. Johnston, K.C.M.G. London: Hutchinson and Co. Ltd. 1936. (Pp. 286; 19 illustrations. 12s. 6d. net.)

[9] *Tabulae Biologicae Periodicae.* Band v, No. 4; Band vi, Nos. 1 and 2. The Hague: Dr. W. Junk. 1936. (Complete volume, 32.50 fl.; subscription price, 28.50 fl.)

[10] *A Comprehensive Treatise on Inorganic and Theoretical Chemistry.* By J. W. Mellor, D.Sc., F.R.S., Vol. xv. London: Longmans, Green and Co. 1936. (Pp. 816; 423 diagrams. 63s. net.)

master might be more profitably spent by the student who is destined for general practice in acquiring a really sound knowledge of the operations and manipulations which he will find it necessary to carry out in the regular course of his work. Dr. Christopher's book covers this ground thoroughly. The English reader will at times be somewhat puzzled by the author's mode of expressing himself. For instance, such a sentence as "Where there has or has not been gross rupture of ligaments, no displacement or injury to semilunar cartilages, or no injury to the spine of the tibia, and where the mechanical structure of the knee-joint is grossly undisturbed, the effusion may be treated by itself" sounds strangely to English ears. Dr. Christopher ends his comprehensive survey of injuries, infections, and minor operations with a long chapter addressed to the newly appointed hospital resident, in which he offers advice on how the young intern should conduct himself towards the patients, the nurses, and the visiting staff.

Preparations and Appliances

PORTABLE GAS AND AIR APPARATUS

Mr. Louis Carnac Rivett writes:

The apparatus for the administration of gas and air which I demonstrated at the B.M.A. meeting at Oxford and which

has been made to my design by the British Oxygen Company can now be obtained from the leading surgical instrument suppliers or direct from the British Oxygen Company, Wembley, Middlesex.

In designing this apparatus my main object was to produce a light, compact machine primarily for the use of midwives. Experience has shown me that midwives are apt to find difficulty in manipulating the spanner in order to attach the cylinder to the machine, or to turn the gas on or off. I also found midwives are very apt to turn on both cylinders attached to the original Minnitt machine, and at the end of the administration fail to turn either off completely, with the result that the gas slowly leaks, and when the machine is next required both cylinders are empty.

I therefore designed a machine that has no spanners whatsoever. There are two handles fixed to the case, one of which fixes the cylinder in place and the other automatically fits on to the spindle for turning on the gas. The apparatus is designed to give a mixture of 35 per cent. N_2O in air. One fifty-gallon cylinder only is fitted to the apparatus (in one model a spare cylinder is carried inside the case, but not connected up). The fifty-gallon cylinder is, in my opinion, an important point in economy. In practice fifty gallons last about one hour, and if only a small quantity is used and the tap inefficiently turned off less than fifty gallons is wasted by leakage. In order that doctors may use the apparatus for any minor anaesthetic work there is an adjustable valve, which can only be altered by the use of a special key, which should not be supplied to any unqualified person. A press button can be fitted, enabling pure N_2O to be administered so long as the button is depressed, but is not fitted on the "midwives'" model.

This apparatus has been in constant use at Queen Charlotte's Hospital. It has given very satisfactory results, and has not been out of order or "sprung any leaks," and the committee of management has permitted it to be called the "Queen Charlotte's Model." The apparatus has been passed by the committee of the British College of Obstetricians and Gynaecologists as conforming to the requirements of their

recommendations. The illustrations show (*a*) the complete machine in working order, and (*b*) the machine strapped on to an ordinary cycle carrier.

COPPER GUAIACOL SULPHONATE PREPARATIONS

Cuprodine tincture, cuprodine ointment, plastosol, and burnojel (A. de St. Dalmas and Co. Ltd., Leicester) are four preparations which contain copper guaiacol sulphonate combined with antiseptics. This copper salt is a powerful astringent and styptic. Cuprodine tincture contains 2 per cent. tincture of iodine together with the copper salt, whilst cuprodine ointment contains the copper salt and an iodine compound (undecylenic iodine). Plastosol contains the copper salt and this iodine compound with a collodion base. Burnojel, which has already been noted (*British Medical Journal*, July 25th, 1936, p. 181) is a jelly which contains the copper salt together with acriflavine. The makers claim that the powerful astringent action of copper guaiacol sulphonate makes it a valuable addition to preparations used for the treatment of burns and wounds. The preparations are all made up in a form convenient for use.

ANTISEPTIC FOR VAGINAL USE

"Aptor" tablets (Messrs. Aptor Manufacturing Company) contain the antiseptic sodium toluol sulphone chloramide. This is claimed to be a non-irritant antiseptic specially suitable for vaginal lavage.

British Medical Journal

SATURDAY, DECEMBER 19th, 1936

HAIL AND FAREWELL

No body of citizens in the British Empire has stronger feelings of loyalty to King and Constitution than the medical profession. Its members therefore shared to the full the anxiety and tension of the nine days between December 2nd and December 10th, and followed with deep concern the momentous happenings that led to a change of Sovereign on the afternoon of December 11th. The British Medical Association, numbering over 36,000 medical men and women in all parts of the world, welcomes King George VI to the Throne, with loyal and affectionate greetings to Their Majesties and the two young Princesses ; and gives a farewell salute, in sadness, to the outgoing Monarch whose services to medicine and to the sick and suffering, as Prince of Wales and as King, will not be forgotten. In the name of all our readers we express the hope that King George VI, like Edward VIII, George V, and Edward VII before him, will honour the Association by becoming its Patron within a short time of his accession. As Duke of York he has identified himself with many good causes, notably those of industrial hygiene, cancer research, and improvement of the national physique. Long may he live to promote the happiness and health of his people.

PHYSICAL EDUCATION

In the House of Commons on November 5th the Minister of Health referred to the work of the British Medical Association's Committee on Physical Education, and said that he would like members of the House to study the committee's "very excellent report." Since this report was published last April there has been a marked increase in the general interest in physical education, and it is noteworthy that most of the measures for improving the national fitness which have been advocated in Parliament and in the Press during the last few months had already been recommended by the B.M.A. Committee. That physical education shall not be regarded in isolation from other kinds of education ; that a larger number of suitably qualified teachers shall be provided ; that physical instruction shall be made a part of the training of all university students ; that the importance of adequate nutrition shall not be overlooked—these are but a few of the recent demands which are entirely in accordance with the suggestions of the B.M.A. report. The general agreement that any solution of this problem should be sought on a voluntary basis has led to a fear that nothing effective would be done, but this fear has proved groundless. The Government departments concerned are pursuing an active policy, and we note with satisfaction that the recommendation of the Physical Education Committee for the provision of suitable clothing in elementary schools has already been adopted. Meanwhile, many public schools are showing in a practical manner an increased interest in this aspect of education.

It is not unnatural that the predominant note of criticism centres in the demand for increased facilities for playing fields and recreation centres for the younger section of the population, the need for which is so outstanding, but the equally important need for training facilities for teachers must not be allowed to take a minor place. Until such facilities are provided there can be no real co-operation between the science of medicine and physical education. Physical education is an aspect of preventive medicine that requires opportunity for scientific study. There can be no place more suited for such study than a university centre, and it is earnestly to be hoped that one or more of our leading universities will recognize this need and make provision to meet it. Meanwhile the encouraging efforts in many directions to bring about a better state of things sadly lack some central guiding force. The hope expressed in the British Medical Association's report that the newly formed Central Council of Recreative Physical Training might take a lead in this matter is far from realization. Lack of funds and the close co-operation of the Central Council with the National Playing Fields Association may lead to a concentration of its interests in the activities of the latter body to the exclusion of the wider aspects of the problem: this would not, in our opinion, be desirable. The terms of reference to the Physical Education Committee of the B.M.A. have been discharged, and its report will remain an outstanding contribution to the subject, but the Council of the B.M.A. has wisely decided to reappoint the strictly medical side of the committee on a new basis in order to continue its efforts to further a cause in which it has the profoundest belief.

SYPHILIS AND ITS TREATMENT TO-DAY

In very few diseases has therapy made such advances in recent years as in syphilis. Less than thirty years ago the disease commonly passed through its natural stages—primary, secondary, and tertiary—treatment or no treatment. Many now living can remember as common occurrences the disfiguring lesions such as breaking down gummata and rupia, which are comparative rarities nowadays. To-day the person who contracts syphilis and is treated under optimum conditions can look forward to the disappearance of all early lesions within a week or two and complete cure in less than two years, whereas formerly the syphilitic was liable to exhibit well-marked lesions over long periods, while treatment was practically never ended nor cure

obtained ; moreover, the treatment itself frequently set up a stomatitis which was more unpleasant for the patient than the disease itself. No doubt the disease has tended gradually to become milder in Europe since its introduction in the fifteenth century, but the present favourable position—more especially in Great Britain and the Scandinavian countries—is due not only to the discovery of salvarsan and its derivatives, but also to earlier and more certain diagnosis, the result of the discovery of the *Spirochaeta pallida* and the use of the dark-ground microscope, and the employment of blood tests such as the Wassermann and various flocculation reactions. Moreover, we now have bismuth, which has largely superseded mercury, and tryparsamide for neurosyphilis, while general paralysis of the insane, which used to mean certain death within a few years, can now be cured, or at any rate checked, in from 30 to 60 per cent. of cases, more especially if taken in hand early and treated with malaria or one of the other various forms of artificial pyrexia.

There is another contributory factor, which must not be forgotten, in the decline of syphilis, and that is the effect of administrative measures, such as the setting up of clinics with free treatment, the better education of students and doctors, and the education of the public. Modern treatment of early syphilis can now largely be stereotyped, consisting in the injection of some form of arsphenamine and bismuth—a period of twelve to eighteen months often being enough to eradicate the disease completely. Some give the two drugs concurrently in courses of about ten injections of each with short rest periods of a few weeks between courses ("intermittent treatment"), others give alternating courses of each drug with no intervals ("continuous treatment"). The difference between the two methods is less than would appear at first sight, and both methods produce a very high percentage of cures under optimum conditions. In a recent publication Dr. W. A. Hinton[1] recommends a course of arsphenamine and bismuth given concurrently, then courses of protoiodide of mercury by mouth or mercurial inunctions, arsphenamine, mercury, arsphenamine, bismuth and arsphenamine (each course lasting eight weeks) as his intensive treatment ; this is followed by courses of bismuth, arsphenamine, mercury, iodide, bismuth, iodide to a total of thirteen courses over a period of about three years. This is not in accord with modern opinion as expressed by the League of Nations Committee and the American Co-operative Clinical Group. The former recommends forty injections of arsenic and forty of bismuth in courses of ten of each with rest intervals of three to five weeks provided the patient becomes and remains serologically negative by the end of the first ten.

There is no doubt that, in this country at any rate, there has been a big decline of recent years in the incidence of syphilis and in deaths from congenital syphilis, while the outlook to-day for the late or latent case, the tabetic or the general paralytic, is incomparably better than it was even so recently as twenty-five years ago, thanks to the various factors mentioned above. Opinion in America is waking up to the fact that much can be done—as it has been done in Great Britain and the Scandinavian countries—in tackling the problem of syphilis by administrative measures such as free treatment clinics, ante-natal and baby clinics, education of the public by propaganda, including lectures, posters, and the wireless. If all civilized countries would adopt these measures the incidence of syphilis might be brought down to the level of that of small-pox in a comparatively few years. As it is, the person who contracts syphilis nowadays, who is diagnosed early, and who receives adequate treatment, can look forward with a reasonable degree of certainty to complete cure, while the syphilitic mother who is treated during pregnancy will produce a healthy baby in a very big proportion of cases. Syphilis is no longer a fearsome and disfiguring disease, and rarely a fatal or incapacitating one, provided it is treated early and adequately.

[1] *Syphilis and Its Treatment.* By William A. Hinton, M.D. H. Kimpton. (15s.)

PROBLEMS OF NERVE GRAFTING

Grafting operations upon nerve trunks damaged as the result of injuries sustained in the war were attended by many disappointments, and as a result British surgeons became rather sceptical of the value of this procedure. In 1931, however, Ballance and Duel showed that in monkeys and in men recovery of function followed the implantation of a short nerve graft across a gap in the intrapetrous portion of the facial nerve, and interest in the possibility of successful grafting was revived. These workers, believing in common with Cajal and others that a degenerating nerve exerted a neurotrophic influence on the sprouting axis cylinders of the regenerating nerve, advocated the use of a degenerated or degenerating graft in preference to a fresh one. Right up to the time of his death Sir Charles Ballance remained keenly interested in problems relating to nerve grafting, and not long before he had to take to bed he had begun in the Research Laboratories at the Royal College of Surgeons of England a further series of experimental investigations. Working with him were Mr. F. H. Bentley and Miss Margaret Hill, who have now published the results of this work.[1] For the bulk of the experiments the external popliteal nerve of cats was chosen. Their studies have shown that preliminary degeneration does not in itself facilitate subsequent axonal growth, and they were unable to find that any advantage accrued from any possible neurotrophic attraction in the degenerated graft ; in other words, degenerated or degenerating grafts behaved no differently from fresh grafts in regard to the subsequent restoration of function. They believe that the bad results of nerve grafting in war cases were due to the amount of scar tissue at the sites of the anastomosis, because their work has shown that in order to obtain a satisfactory result from nerve grafting one must employ a graft of the same calibre as the nerve into which it is grafted and take scrupulous care in suturing the nerve sheath so that scar formation will be minimal. It will be recalled by some that during and after the

[1] *Brit. Journ. Surg.*, October, 1936, xxiv, 94, 368.

war it was customary to bridge a nerve gap with several strands of cutaneous nerve, a technique which probably produced much scar tissue and therefore jeopardized the result. Bentley and Hill attempt to explain the results which Ballance and Duel claimed from the use of degenerating grafts by stating that all such results are dependent upon the amount of scar tissue ; they point out that after a nerve undergoes Wallerian degeneration it becomes firmer and stiffer and can be more accurately sutured than a soft friable piece of fresh nerve, and that suturing was therefore probably more effective with degenerating than with fresh nerve. Further experiments were undertaken to compare the behaviour of grafts taken from other cats with that of grafts from the same cat—that is, homografts with autografts. It was found that the former set up a local reaction which somewhat delays restoration of function, but that this ultimately occurs and is as effective as with autografts. Bentley and Hill conclude their interesting and valuable paper by claiming that their experimental work has shown that a nerve gap 3 cm. in length can be bridged by a nerve graft taken from the same or a similar animal, so that anatomical and physiological continuity of the nerve are both restored, and that the results of using fresh or degenerated grafts are indistinguishable. These findings should prove of paramount importance to those called upon to treat lesions of peripheral nerves, for they appear to be directly applicable to some of the problems with which the surgeon is confronted in such cases.

DOSAGE OF ANTITOXIN IN DIPHTHERIA

A report[1] on the dosage of antitoxin in diphtheria has just been published by the London County Council ; in some respects it is complementary to a similar publication by the Council on the nomenclature of diphtheritic infections which appeared early this year. The present work was undertaken by a departmental committee consisting of six medical superintendents of the Council's fever hospitals, three of whom were members of the previous committee. It shows some of the defects inherent in the findings of committees which are arrived at in a spirit of compromise, but, as it stands, the report may be taken to represent fairly the present position in the serum treatment of diphtheria. A classification based primarily on anatomical grounds had been formulated by the first committee (and accepted by the present committee), which will meet with general agreement, chiefly because it takes into account the crucial factor of toxaemia. In this respect it constitutes a distinct advance on Bie's purely anatomical classification, but the decision to retain the term "faucial" and to introduce the term "naso-pharyngeal," to denote late or severe forms, is to be regretted. The latter term by itself is a misnomer, and is likely to mislead even an expert, unless he is himself acquainted with the full text. Certain non-respiratory forms of diphtheria, many of them rare, are enumerated in the present report, but no mention is made of aural diphtheria, which, although possibly not amenable to serum therapy, often raises difficult administrative problems. The schedule of doses given will meet with general approval: 1–2,000 units of antitoxin intramuscularly for passive immunization, lasting up to twenty-one days ; 2–10,000 units intramuscularly for mild cases ; 15–30,000 units intramuscularly or intravenously, according to severity (the latter route if more than 20,000 units are given) ; and 50–100,000 units for the most severe cases, by the intravenous route if feasible. Larger doses are held to be justifiable in exceptionally severe cases. The maximum dose is thus more than twice that recommended by Park in 1921. It is probable that the larger doses are only required in the severe forms of the disease associated with "gravis" strains, but the committee does not refer to this possibility. The dosage scheme is given in a convenient and condensed form, but a too lavish use of asterisks has obscured rather than clarified certain matters which it was sought to emphasize. The need for assessing accurately the degree of severity in a particular case, of determining the appropriate dose, and of administering it as early as possible by the selected route is rightly stressed. For routine use intramuscular injection is recommended, and the intravenous route is reserved for the severer grades ; when the latter is for any reason contraindicated the serum should be injected intraperitoneally. No references are given to investigations on the relative rates of absorption from the different sites, nor does the committee appear to have conducted comparative tests with a view to confirming previous observations. Probably the part of the report dealing with the untoward effects of serum administration is of most practical value to the practitioner, although these effects are becoming less frequent as serum is being further purified and concentrated. Serum disease may appear seven to twenty-one days after injection in individuals who have not had serum before. If a second dose is given after the lapse of that period, when a state of sensitiveness may have been established, a reaction may appear in an hour—"immediate reaction"—or within a week (commonly two to four days)—"accelerated reaction"—or the length of the latent period may not be altered. Generally speaking the shorter the interval between primary and subsequent injection the more probable and more severe are anaphylactic reactions likely to be. In asthmatic patients a violent immediate reaction may follow primary injection. The committee likens severe, immediate, or accelerated reactions to the rigors and collapse which not infrequently follow intravenous administration, but considers that the mechanism may be different. To avert the latter it advises slow administration at body temperature. The committee believes that "in suitable cases dilution of the serum with saline or glucose-saline may minimize reactions," but does not specify which type of case is considered suitable or what is the appropriate dilution of serum or concentration of glucose. Somewhat numerous and unnecessarily involved directions are given for testing for sensitivity and for securing desensitization, but the method of introducing a minute dose of diluted serum into a vein as a preliminary to intravenous administration of serum has been omitted. Although it is pointed out that there is no exact parallel between skin response and constitutional reaction there is no mention of the alternative conjunctival test which many American workers have found more reliable in sensitive subjects before administration of serum in lobar pneumonia.

[1] *The Dosage of Antitoxin in Diphtheria.* Report of Departmental Committee appointed by the County Medical Officer of Health and School Medical Officer, London County Council. (6d.)

THE VALUE OF ARTIFICIAL PNEUMOTHORAX IN PULMONARY TUBERCULOSIS

As Dr. F. J. Bentley indicates in his excellent summary of the literature which forms Part I of a report lately issued by the Medical Research Council,[1] no conclusive statistical work on the value of artificial pneumothorax has yet been produced. Fitness for work or survival of the patient at the end of five years may be regarded as a satisfactory criterion in the evaluation of artificial pneumothorax, though the former is the less satisfactory of the two in view of the wide range of physical exertion undergone in various occupations. Dismissing such obvious causes of error as paucity of cases investigated, inadequate period of observation, or high proportion of untraced patients, there remains the all-important problem of what patients to choose as a control group to those treated with artificial pneumothorax. Ideally they should be composed of cases suitable for artificial pneumothorax, with a free pleural cavity, not so treated. This is clearly impracticable. On the other hand, Dr. Bentley rightly stresses the fallacy of choosing for this purpose patients in whom a pneumothorax could not be induced owing to extensive pleural adhesions. He has therefore attempted to avoid this error by comparing 677 cases of artificial pneumothorax under the London County Council anti-tuberculosis scheme, treated between 1921 and 1930 (of which 411, or 60.7 per cent., were followed up for five years), with a control group of 3,329 conservatively treated subjects discharged from the London County Council tuberculosis institutions in 1927 and followed up for five years. The results are classified according to age, sex, extent of disease, condition of better lung, degree of collapse, persistence of tubercle bacilli in the sputum, home conditions, and duration of stay in the institution. Dr. Bentley admits that such a control group is not perfect. Thus he points out that in the artificial pneumothorax (A.P.) cases this method was only attempted when "several weeks" of conservative treatment had shown no response; yet the conservative group was classified according to the condition on admission, and the A.P. group according to the condition before induction. This latter group had longer periods of institutional treatment and better after-care—factors that must be borne in mind in assessing the value of pneumothorax therapy. The conservative group contained cases "so benign that pneumothorax would never be considered" and "many who would by present standards be eminently suitable for collapse therapy, and at the other end of the scale those too obviously ill for such interference." Dr. Bentley emphasizes that both groups consisted of people drawn from identical sociological and environmental sections of the population; but he does not stress the fact that the patients were treated in different institutions, the medical superintendents of which, certainly before 1930, differed in their views as to the indications, contraindications, and maintenance of artificial pneumothorax. Dr. Bentley states: "It is thought that the conservative group gives a basis, or rough guide, to what one might have expected would happen to the pneumothorax patients if special treatment had not been adopted. But it is not claimed that the conservative group forms other than a base line from which to attempt the evaluation of the results of treatment along broad general lines." The survival in all the cases investigated was approximately 20 per cent. higher in the A.P. group than the expected number among those conservatively treated. But of the A.P. cases no fewer than 60 per cent. had incomplete collapse of the lung; of these only 50 per cent. were alive at the end of three years, as against 66 per cent. of those in whom complete collapse had been obtained. As only five patients in the whole series had undergone adhesion-section, it is obvious that the results of such an A.P. group would be much better at the present time, when this procedure, converting incomplete into complete collapse, is practised more often. "The degree of collapse obtained," Dr. Bentley writes, "is only second in importance to the original choice of case even judged by anatomical standards only. Even with complete collapse the presence of only 'slight' contralateral disease materially reduces the chance of survival. That strict unilaterality is important is seen by the fact that such cases, even in the face of incomplete collapse, appear to fare slightly better than complete collapse cases with but 'slight' contralateral involvement." It is to be hoped that this conclusion will not lead to the restriction of this form of treatment to strictly unilateral cases; for experience has shown that patients with a relatively small lesion on the contralateral side will do well provided that the artificial pneumothorax is maintained at negative pressures, and the patient is given stricter and longer rest, combined perhaps with sanocrysin. Dr. Bentley also found that the medical condition of the "A.P. survivors" was much better than that of the other group: in 64 per cent. the disease was quiescent at the end of three years and after five years approximately the same, compared with 38 per cent. among those conservatively treated. If 20 per cent. is taken as accurately representing the benefit in A.P. cases before 1930, it is most probable that the results at present would show a higher figure. Dr. Bentley rightly emphasizes that artificial pneumothorax should be induced at an early stage of the illness, particularly in young adults; the longer the disease is allowed to progress the greater the likelihood of adhesions forming.

[1] Artificial Pneumothorax. Experience of the London County Council. By F. J. Bentley. Medical Research Council, Special Report Series, No. 215. (1s. 6d. net.)

TACHYCARDIA AND HEART FAILURE

The very rapidly beating heart associated with ectopic rhythms such as auricular fibrillation and the several varieties of paroxysmal tachycardia is believed to fail sooner or later if the rhythm continues. When failure occurs with normal rhythm, however, there is usually only a moderate degree of tachycardia, and here the increased rate is a sequel to and not a cause of the failure. In a recent article D. Luten[1] emphasizes the false attitude sometimes taken towards the simple tachycardias which accompany such conditions as infections, haemorrhages, and shock. Inasmuch as the increased heart rates in these conditions are reflex and compensatory, being designed to increase the circulation rate to meet a definite need, any therapy aimed directly at reducing the rate is misguided. Where the fast rate is a result of heart failure, it is directly due to a lowered efficiency of the myocardium; here digitalis

[1] *Amer. Heart. Journ.*, October, 1936, p. 435.

and its allies can raise the efficiency, and in so doing will allow the heart to accomplish more work—hence a slowing will result. The slowing action of digitalis by virtue of its effect on cardiac efficiency is also applied by the author to auricular fibrillation—a new conception, in that the slowing effects of the drug are usually held to be mainly on the conducting tissues and less dependent on the direct action on the contractile tissue. Luten considers, however, that digitalis is without slowing effect in fibrillation when there is no heart failure, and this irrespective of the underlying damage to the myocardium—that is, whether it be toxic or the result of chronic inflammatory or degenerative changes. A second novel point of view is that, like simple tachycardia, auricular fibrillation also may be the result of cardiac failure—the reverse of the usual view. It is suggested that an increase in auricular pressure consequent upon ventricular failure is the factor which may often precipitate the abnormal auricular rhythm. No detailed observations are given to support this or any other of the author's conceptions, but they are of great interest and might usefully be further investigated.

PHYSIOLOGICAL STUDY OF YOGIS

The effect of the mind upon the body has intrigued philosophers throughout the centuries, and in these days is being seriously investigated by medical psychologists. One of the mysteries of the East is the voluntary control over such apparently involuntary functions as the maintenance of the heart beat, a control which the Yogis in India claim to exercise. C. Laubry and T. Brosse[1] travelled to British India in order to examine certain physiological effects among these people. The investigations included the simultaneous registration of pulse, respiration, and electrocardiogram, together with, in some instances, an estimation of the basal metabolism. Blood pressure readings were also taken, and observations were made during the Yogi exercises, lasting usually for about fifteen minutes. Several hundred metres of photographic film were used in the forty separate investigations carried out. Laubry and Brosse found that the Yogis could maintain periods of absolute apnoea usually for five minutes after an initial abnormally long and deep inspiration. They sometimes also found apparent apnoea, which was, in fact, accompanied by a very superficial type of breathing imperceptible save on the electrical records and lasting between fifteen minutes to several hours. The pulse records obtained during the periods of "trance" show modifications not only in rhythm but in the character and the waves, and on occasions, during the periods of apnoea, it was possible to demonstrate almost complete disappearance of the pulse at the wrists. But modifications in the electrocardiogram are of particular interest, since they deal with variations in the conduction time of the heart. During the trance the P wave might disappear, followed by a reappearance, during which time the T wave then became considerably flattened. The Yogi, at the end of some special exercises, during which the foregoing modifications had been observed, would announce that he had now gained "control of the heart," and at this moment the electrocardiogram became completely normal. Other examples are given, with illustrations, of changes in the R and S waves, and in every case a return to normal was the rule when the Yogi had concluded the particular set of exercises chosen for securing mental control over bodily functions. Blood pressure readings before and after the Yogis' experiences were apparently normal, and basal metabolic rate estimations seemed to suggest that there was some slight reduction. As the authors frankly admit, the facts obtained by them are not only curious but difficult to interpret. As experimental subjects, the Yogis must be regarded as exceptional in view of the long periods of special mental and physical discipline which they have undertaken. The results, however, are in keeping with the modern orientation of medicine towards giving a more honourable place to the psychological causes of apparent physiological disturbances than has hitherto been allowed.

[1] *Presse Méd.*, October 14th, 1936, xliv, 1601.

DECLINE OF TUBERCULOUS INFECTION IN CHILDREN

The decline in the death rate from tuberculosis at all ages is already giving a different aspect to the problem of this infection in childhood. From a recent analysis[1] of nearly 5,000 children tested with old tuberculin between the years 1926 to 1934 inclusive, P. W. Beaven reaches the conclusion that if the present rate of decline continues tuberculosis in children will soon be a rare disease. The tests were carried out on patients admitted to the children's division of the Strong Memorial Hospital and the Rochester Municipal Hospital, New York State, and over the whole period 9.6 per cent. of the children gave positive reactions to the Mantoux test, whereby 0.1 c.cm. of a 1 in 1,000 dilution of old tuberculin is injected intracutaneously. The decline in the proportion of children with positive reactions during the course of the survey was 62 per cent., while the mortality among infected children has changed little, death from tuberculosis occurring most frequently in the age group of 1 to 5 years. Among other points that have come out of the investigation is the significance of a positive reaction at different age periods. For example, 52 per cent. of all children from 1 to 5 years inclusive with a positive reaction to old tuberculin had clinical or *x*-ray evidence of the disease, whereas in older children—from 6 to 14 years—such evidence was present in just over 40 per cent. The nutrition of the children under observation was taken into account, and among those with positive reactions and either clinical or *x*-ray evidence of tuberculosis 76 per cent. were well nourished; and 80 per cent. of the positively reacting children without clinical or *x*-ray evidence were also classed as well nourished. Regarding the source of infection, approximately 25 per cent. of the group having positive reactions to old tuberculin were known to have been exposed to tuberculosis. In surveying the literature, Beaven points out that this decline in tuberculous infection has been reported from other centres, and after discussing the various factors he concludes that the evidence at present available does not support the view that there has been any attenuation in the virulence of the tubercle bacilli during the period under review, the reason for the decline appearing to be that fewer persons are infected with the tubercle bacillus.

[1] *Amer. Journ. Dis. Child.*, 1936, lii, 565.

THE ENDOCRINES IN THEORY AND PRACTICE

This article is one of a series on Endocrinology contributed by invitation

CHEMISTRY OF THE THYROID GLAND

BY

CHARLES ROBERT HARINGTON,
M.A., Ph.D., F.R.S.

The modern work which has led to the fairly complete elucidation of the chemistry of the thyroid gland has its origin not in the direct study of the gland itself but in the investigation of the factors concerned in the production of simple goitre; as is well known, indeed, this disease had been recognized and studied for centuries before the first anatomical description of the thyroid gland appeared.

The general features of the occurrence of endemic goitre, which need not be discussed here, had led already in early times to the widely held opinion that an environmental abnormality must be the basic cause of the disease; in the minds of most authors who dealt with the subject this abnormality was associated with the water of the districts where the disease occurred, but there was no agreement as to whether the explanation was to be sought in the excess or deficiency of a normal constituent of the water or in the presence of a specifically toxic substance.

Among the numerous remedies which have been in use from ancient times for the treatment of goitre there is one to which continuous references can be traced for at least seven hundred years—namely, the ash of burnt sponge. Until the beginning of the last century nothing was known concerning the composition of this material which could afford an explanation of its efficacy, but shortly after the discovery of iodine in 1812 by Courtois, who isolated it from burnt seaweed, the new element was discovered to be a constituent of sponge. The clue thus provided was seized upon by Coindet of Geneva, who immediately and successfully applied preparations of iodine to the treatment of patients suffering from goitre.

The deduction from Coindet's results, which now seems obvious, that deficiency of iodine might be the long-sought environmental cause of goitre, was not, however, made, or at least was not widely accepted. In the first place the iodine therapy itself was carried to an excess of overdosage which had disastrous results and brought it into disrepute, and in the second place the conception of deficiency as a cause of disease was unfamiliar to the medical profession. Even the extensive and careful investigations of Chatin some thirty or forty years later, which clearly demonstrated a relationship between environmental deficiency of iodine and prevalence of endemic goitre, did not carry conviction. It was not, indeed, until quite recent years that repetition of his work by von Fellenberg in Switzerland and by McClendon in America, together with the success which has attended careful prophylactic therapy with iodine, has finally gained general acceptance for the view that deficiency of iodine is in fact the principal cause of simple goitre.

In the meantime, however, the work of Kocher and of Murray, which will be referred to in more detail in the following article, showed beyond doubt that the thyroid gland was an organ which was essential to normal life and that it exercised its function in the body through the medium of an internal secretion. At the time when these discoveries were made there was sufficient evidence of the connexion between iodine and disease of the thyroid gland to inspire a search for iodine in the normal organ itself. This search resulted in the discovery of iodine in the thyroid by Baumann in 1896, at which point the development of the chemistry of the thyroid really begins.

Relation of Iodine to Thyroid Activity

Baumann's contribution was not limited to the demonstration of the presence of iodine in the thyroid. He was able further to show that the iodine occurred almost exclusively in organic combination, and, from rather crude physiological tests, he deduced that iodine was definitely related to the physiological activity of the gland. The investigation was carried a stage further by Oswald, who found the characteristic "colloid" with which the vesicles of the thyroid gland are filled to be a protein (thyroglobulin), and showed that it was to this protein that the iodine was attached. No success, however, attended the efforts of either of these workers or of Hutchison to isolate any clearly characterized iodine compound from the thyroid either directly or after the application of various methods of degradation.

The admirable investigations of Marine (1907–12) provided additional evidence in strong support of the hypothesis that the thyroid owed its physiological activity essentially to its iodine content, and this supposition received its final confirmation when Kendall, in 1914, isolated a pure compound containing 65 per cent. of iodine, which exhibited qualitatively the characteristic physiological properties of the whole thyroid gland.

Isolation of Thyroxine

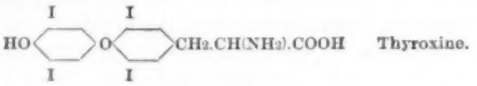
The compound isolated by Kendall was named by him thyroxine, and is now generally regarded (perhaps as we shall see later with some inexactitude) as the active principle of the thyroid gland.

Kendall's success in isolating this compound was due to his patient pursuit of the only method of degradation of the gland material which appeared, in view of the earlier work, to offer a favourable prospect. The previous investigators had employed acid hydrolysis and enzymic digestion with entirely discouraging results; the method of alkaline hydrolysis had, however, been neglected, possibly because it is usually more destructive in its effects, and it was this method which Kendall applied. He was able to show at once that a relatively mild alkaline hydrolysis of whole thyroid gland made possible the separation of the iodine-containing constituents into acid-insoluble and acid-soluble fractions, the former of which contained the whole of the physiological activity. By the further degradation and laborious fractionation of the acid-insoluble fraction Kendall was finally able to isolate a minute yield of pure thyroxine.

The amount of thyroxine obtainable by the original method was so small as to render work on the chemistry of the compound difficult or impracticable, particularly in view of the large percentage of iodine. The isolation of thyroxine was, however, considerably facilitated by a modification of Kendall's procedure devised by the present writer, which consisted in the substitution of barium hydroxide for sodium hydroxide as the alkaline hydrolytic agent. By the improved method it was possible to obtain a yield of more than 0.1 per cent. of thyroxine from a good sample of dried thyroid gland, and systematic work on its chemistry could be undertaken.

Chemical Identification of Thyroxine

It is not proposed in this article to discuss in any detail the chemical work which led finally to the synthesis of thyroxine ; suffice it to say that by degradation experiments it was ascertained that thyroxine from which the iodine had been removed by replacement with hydrogen (thyronine) was the *p*-hydroxyphenylether of tyrosine. It was further deduced that the four iodine atoms of thyroxine occupied the 3:5:3′:5′-positions in the molecule of thyronine, and this supposition was proved to be correct by the synthesis of 3:5:3′:5′-tetraiodothyronine, followed by the chemical and physiological identification of the synthetic product with thyroxine isolated from the thyroid gland.

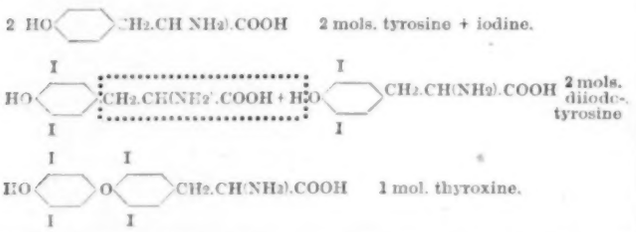


Thyroxine.

The isolation and identification of thyroxine were far from representing a terminal stage in the study of the chemistry of the thyroid ; many questions were left open, of which a few may be briefly discussed here, since light has been thrown upon them by subsequent work.

Biological Origin of Thyroxine

The structural formula of thyroxine indicates its obvious chemical relationship with tyrosine, and suggests immediately that the latter amino-acid is the biological precursor of thyroxine, as it is almost certainly of adrenaline. Before the isolation of thyroxine only one other iodine-containing amino-acid was known—namely, 3:5-diiodotyrosine, which was first isolated many years ago from the coral *Gorgonia*, and which can be easily prepared artificially from tyrosine and iodine in alkaline solution. Tyrosine is, in fact, the only known amino-acid which may be expected to take up iodine under conditions which are likely to arise in the body. Having these facts in mind, it is easy to picture the probable mode of biological synthesis of thyroxine from tyrosine through the stage of diiodotyrosine:



No direct evidence of the occurrence of this series of reactions in the body can be adduced, although the recent remarkable experiments of Salter, to be referred to later, may indicate the possibility of the conversion of diiodotyrosine, when in combination with other substances, into thyroxine. By chemical means, however, it has been possible to show that natural tyrosine and natural *l*-thyroxine are stereochemically related, as would be the case if thyroxine were derived from tyrosine by a series of enzymically controlled reactions. When it is remembered in addition that diiodotyrosine actually occurs in considerable amount in the thyroid gland (see below), it will be seen that there is strong presumptive evidence in favour of the scheme outlined.

Non-thyroxine Iodine of the Thyroid

It has already been mentioned that the first stage in the isolation of thyroxine from the thyroid involves a mild alkaline hydrolysis which divides the total iodine into two approximately equal portions—acid-insoluble physiologically active, and acid-soluble inactive. Now the properties of thyroxine are such that a mild alkaline hydrolysis would have little or no destructive effect upon it. Whatever the nature of the acid-soluble portion of the iodine, therefore, it must represent something which was present as such in the original gland and not an artefact produced in the course of hydrolysis.

Careful study of the hydrolytic products of the thyroid led eventually to the isolation of diiodotyrosine from the acid-soluble portion, and quantitative considerations have made it possible to conclude that the presence of any iodine compound in the thyroid other than thyroxine and diiodotyrosine is unlikely.

We may assume, therefore, that the iodine of the thyroid is present entirely in the form of these two compounds ; their relative proportions are somewhat variable, but in a normal gland we may expect to find 30 to 40 per cent. of the iodine as thyroxine and the remainder as diiodotyrosine.

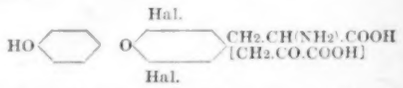
Chemical Structure of Thyroxine in Relation to its Activity

A few words may be said concerning the bearing of the chemical structure of thyroxine on its physiological activity.

The outstanding features of the molecule of thyroxine are its high content of iodine and the presence of the diphenylether linkage. Thyronine—that is, thyroxine from which the iodine has been removed—is devoid of any physiological activity, as is also diiodotyrosine, which contains the *o*-diiodophenolic group characteristic of thyroxine. Neither this group, therefore, nor the diphenylether linkage alone is able to confer upon a compound the physiological properties of thyroxine. On the other hand 3:5-diiodothyronine, which differs from thyroxine only in the loss of two iodine atoms from the "outer" ring, possesses thyroxine-like activity, although in a lower degree ; this substance indeed possesses therapeutic advantages over thyroxine in that it is much more soluble and therefore more readily absorbed than the latter compound.

The side-chain of the thyroxine molecule is of importance to its physiological activity, since the only modification therein which it has been possible to make without total destruction of the activity is conversion into the corresponding keto-acid, and the residual activity of the latter compound is doubtless due to its reconversion into thyroxine in the body. Strangely enough the iodine does not seem to be specifically essential, since 3:5:3′:5′-tetrabromothyronine (the bromine analogue of thyroxine) has been found to possess thyroid-like activity, although in much lower degree than thyroxine itself.

We may summarize, therefore, by saying that in order to exhibit thyroxine-like activity a compound must possess the nucleus of thyronine (or of the corresponding keto-acid) with at least two halogen atoms in the 3:5-positions:



Mode of Combination of Thyroxine in the Thyroid

The facts that both thyroxine and diiodotyrosine are α-amino-acids and that they can only be isolated from the thyroid after fairly vigorous hydrolysis indicate that these compounds must be bound in peptide linkage. This has now been proved to be the case by the successful isolation of both amino-acids by the enzymic digestion of thyroglobulin. Incidentally, whereas thyroxine isolated from the gland by the chemical method is racemized owing to the alkaline hydrolysis which has to be employed, that obtained by enzymic digestion is optically active, and is, in fact, the *l*-isomeride ; the physiological activity of this is about 1.5 times as great as that of the racemic compound.

Nature of the Active Secretion of the Thyroid

From what has been said above it will be clear that in the colloid of the thyroid gland we have a protein which owes its peculiar chemical and physiological characteristics to its content of the two iodine-containing amino-acids thyroxine and diiodotyrosine. It seems reasonable to assume that the thyroid possesses a mechanism for the iodination of tyrosine (it is known that the gland has a high and specific affinity for iodine) and for the subsequent oxidative coupling of pairs of molecules of diiodotyrosine to form thyroxine; both diiodotyrosine and thyroxine so formed will then be combined with other amino-acids and built up into thyroglobulin, which is stored as colloid. It remains to consider what is the actual active secretion which is released by the thyroid into the blood stream.

That this active secretion is thyroxine itself seems unlikely for several reasons. The insolubility of thyroxine is so great that it is difficult to imagine it circulating in the blood in the free condition even in minute concentration. No direct effect of thyroxine on any isolated normal organ or tissue can be demonstrated, and the administration of thyroxine, even intravenously, elicits its effect only after a latent period of astonishing length. Finally, it is impossible to account for the activity of whole thyroglobulin in terms of the maximum amount of thyroxine which it can possibly contain. The most accurate comparisons of the activities of samples of thyroglobulin with their iodine-equivalents of free thyroxine have shown constantly that the activity of the whole protein exceeds anticipation. It is, indeed, becoming increasingly clear that the activity of thyroglobulin is much more closely related to its total iodine content than to its thyroxine content. On the other hand it is equally clear, as pointed out above, that the non-thyroxine iodine of the thyroid is, when separated even by mild methods, totally inactive. The situation is not made easier to understand by the discovery of Salter that fractions of thyroglobulin degradation products, which contain only diiodotyrosine and are themselves inactive, can be converted into active products by subjection to the reversed (synthetic) action of pepsin.

We are thus left with an anomaly which cannot at present be satisfactorily explained, unless we make the improbable assumption that the secretion released by the gland is thyroglobulin itself. There is, however, a hypothesis which is capable of explaining the observed facts more readily and which seems to the writer at the present time to be acceptable.

The loss of activity which leads finally to the discrepancy between the activity of thyroglobulin (or whole thyroid gland) and that of the maximum amount of thyroxine which it can contain occurs during the mild hydrolysis which is the essential preliminary to the isolation of the iodine compounds from the gland. This hydrolysis, as has been seen, is not such as to destroy any thyroxine; all it seems to do is to divide the molecule of thyroglobulin into thyroxine-containing and diiodotyrosine-containing peptides. We may, then, not unreasonably conclude that the true active secretion contains both thyroxine and diiodotyrosine linked either directly or through other amino-acids to form a peptide; in such a compound the activity of thyroxine may well be greater than that of the free amino-acid, and it is also possible that the diiodotyrosine may contribute its part.

Whereas artificial breakdown of thyroglobulin ruptures the linkage between thyroxine and diiodotyrosine, leaving residual activity in the more specific thyroxine fraction only, the natural breakdown of thyroglobulin which constitutes the normal release of active secretion would thus consist in the liberation of the intact peptide containing both thyroxine and diiodotyrosine.

HIGH-VOLTAGE X-RAY THERAPY

NEW DEPARTMENT AT ST. BARTHOLOMEW'S

The Mozelle Sassoon high-voltage *x*-ray therapy department at St. Bartholomew's Hospital, the gift of Mrs. Meyer Sassoon, was opened on December 10th, Lord Stanmore, the treasurer of the hospital, presiding.

The new building comprises a treatment room, flanked by two generator rooms, a control room, an examination room, and other necessary accommodation, but the dominant feature of the department is the *x*-ray tube, which is thirty feet long, extending horizontally from one generator room to the other, across the treatment room. The portion within the treatment room is surrounded by a protective sheath, consisting of a six-inch layer of close-packed lead shot, enclosed between steel cylinders. The beam of *x* rays, transmitted through an aperture in this sheath, can be directed at will, either through the defining applicator towards the patient or into an absorbing lead saddle, six inches thick, suspended immediately above the tube. As the tube is fixed the floor of the treatment room is made movable so that the position of the patient relative to the tube may be adjusted. Two generators are provided, each of 600,000 volts, one of positive potential and the other of negative. The current for each generator is fed from the 400-volt alternating current mains into a transformer, from which a current at 150,000 volts can be drawn. By means of a special circuit, embodying columns of continuously evacuated thermionic valves and oil-immersed condensers, a rectified current at a constant potential of 600,000 volts may be obtained, and thus, by using both generators, a constant potential of over one million volts may be applied to the *x*-ray tube. At this voltage the tube is designed to carry a current of 5 mA. The protective measures are of a very rigid order. In addition to the six-inch lead sheath incorporated in the tube a protective wall of barium concrete has been built between the source of radiation and the operating personnel. The doors in this wall are constructed of heavy steel plates, and there are electrical interlocks on them and on the tube itself, eliminating both the risk of electric shocks and of accidental exposure. The installation is designed to give a beam of *x* rays of greater penetrative power, higher intensity, and shorter mean wave-length than any so far employed in the treatment of cancer.

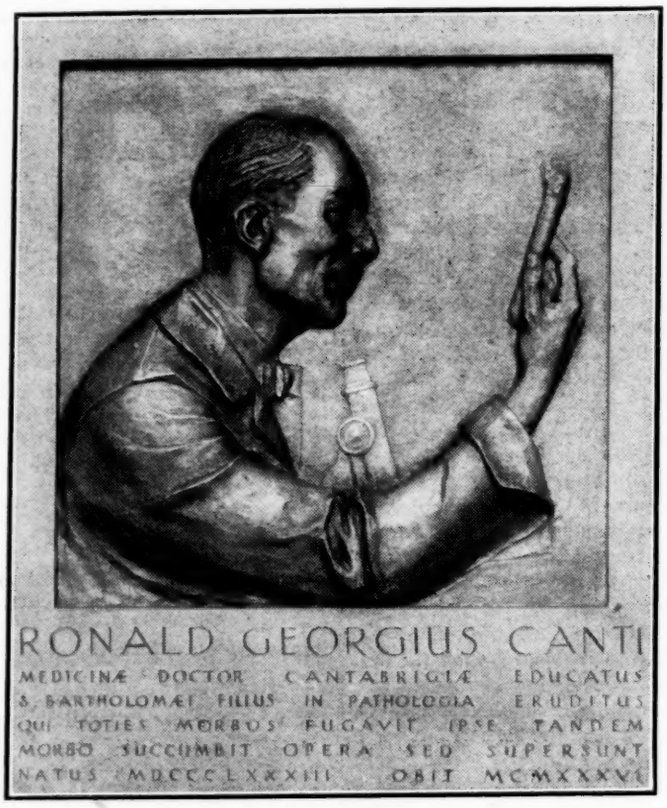
Lord STANMORE expressed the gratitude of the hospital to Mrs. Meyer Sassoon, also to the Halley Stewart trustees for founding a fellowship for a whole-time worker in the department, and to the British Empire Cancer Campaign for an annual grant. An address was then delivered by Lord RUTHERFORD, who mentioned that he was connected with an experiment which was being carried out on a fairly large scale at the Radium Institute, under the aegis of the Medical Research Council and the Department of Scientific and Industrial Research, to determine the usefulness of controlled beams of radiation from a radium bomb, varying from 5 to 10 grams. Sufficient experience had been gained already to show that excellent results were forthcoming, if careful attention were paid to dosage, in certain cases of cancerous growths. With an *x*-ray tube operating at one million volts the *x* rays generated would be of about the same average wave-length as those of radium. In addition, it was to be expected that much more intense beams of *x* rays would be produced than from the radium bomb, so that an equivalent dose could be given in a shorter time.

Lord Rutherford added that he had had the pleasure of inspecting the Mozelle Sassoon installation, and he congratulated the hospital on having the vision and the energy to undertake the experiment. He understood that at first the tube would be used for purely experimental purposes, to ascertain the effects produced by high-voltage radiation on normal and malignant tissues, as compared with the use of gamma rays from a radium bomb. The provision of the new department was a recognition of the great importance of developing the potentialities of high-frequency penetrating radiation. Experiments would be conducted now at as high a voltage as was used in any other country, possibly a higher one. He thought the

time was now ripe for going ahead and developing an important programme of research on high-voltage radiation.

Lord HORDER, who was chairman of the Radiotherapeutic Research Committee set up at St. Bartholomew's in 1923, said that the very alert cancer research and treatment departments at the hospital were working in close co-operation with the British Empire Cancer Campaign, and the new installation was not only a great hospital enterprise but also part of the concerted scheme in which both the hospital and the Campaign were interested. How much good would come from the work on the new installation no one could foretell, but it filled a gap which had previously existed, and whatever ensued from it in the way of benefit to patients it was certain that there would be an addition to knowledge. He recalled the exhortation of Harvey to his colleagues: "Search out the secrets of nature by observation and experiment." Radiation in the treatment of cancer had already much to its credit, and he hoped it would have still more as a result of the installation so generously provided.

After Mrs. Meyer Sassoon had declared the department open Sir CHARLES GORDON-WATSON presented an album to her and thanked her for her splendid gift. The cancer department, he said, could now continue its investigations with the most modern *x*-ray installation in the world, with what results could not be foretold.


RONALD GEORGIUS CANTI
MEDICINÆ DOCTOR CANTABRIGIÆ EDUCATUS
S. BARTHOLOMÆI FILIUS IN PATHOLOGIA ERUDITUS
QUI TOTIES MORBUS FUGAVIT IPSE TANDEM
MORBO SUCCUMBIT OPERA SED SUPERSUNT
NATUS MDCCCLXXXIII OBIT MCMXXXVI

Radiotherapeutic Research

Referring to the development of radiotherapeutic research at the hospital Sir Charles Gordon-Watson said that about the year 1897 the first *x*-ray plant was installed in a small room near Henry VIII's Gate, under the charge of the late Dr. Hugh Walsham. The glass tube then in use was not much larger than the glass retort sometimes now used for making coffee. He wondered what Hugh Walsham would have said if he could see the tube now erected—thirty feet long, made entirely of steel, surrounded by a six-inch lead sheet, and weighing ten tons. Shortly after the war a radium committee was formed at the hospital to organize for clinical research the considerable quantity of radium which had been lent to St. Bartholomew's by the Government through the Medical Research Council. Later, in 1923, a Radiotherapeutic Research Committee was formed, following upon visits by some members of the Radium Committee to Erlangen and to the Radium Institutes in Brussels and Paris. About that time some radium was lent to the British Empire Cancer Campaign, which enabled the late Dr. Ronald Canti, in association with Dr. Malcolm Donaldson, to carry out an epoch-making research on the action of radium upon innocent and malignant tissues in culture, using the cinematograph. The further gift of a gram of radium at about that time ensured that no patient requiring treatment with it was left unaided. In 1924, thanks to an annual grant from the Campaign, the hospital was able to install an *x*-ray research department with a whole-time officer in charge. In 1934, to facilitate the co-ordination of the cancer work in the hospital, the governors formed a cancer department, of which the old Radiotherapeutic Research Committee became the executive.

With regard to the objects of the new installation, some of the difficulties which had beset the *x*-ray worker in the past had been to deliver an adequate dose to a deep-seated tumour without causing damage to the structures in front of it, to give the dose in a reasonably short time, and also to avoid damage to the tissues in contact with the growth, because the difference in radiosensitivity between the normal and the malignant cell was comparatively small. With the new installation there would be far greater penetration, far higher intensity, and a much shorter wave-length. As the new apparatus could be operated at any voltage from 250,000 to 1,000,000, and a little beyond, its range and flexibility would admit of considerable choice in choosing the optimum conditions in different cases. It was therefore hoped to give much larger doses to deep-seated tumours in a shorter time, and as the energy in each quantum increased as the wave-length decreased there would be less interference with normal tissues and a higher degree of selectivity for malignant tissues. Further, the wide range of intensity which now became possible with this gigantic new plant would add to the existing knowledge of the physical, chemical, and biological effects of *x*-radiation, and would, it was hoped and believed, improve the clinical results obtained.

Unveiling of Canti Memorial

A further ceremony was the unveiling of a bronze plaque in memory of Dr. Ronald George Canti, a member of the original Radiotherapeutic Research Committee and also of the Technical Subcommittee set up in 1934. The plaque is the work of Miss Isobel Donaldson, who is to be congratulated on the striking likeness and beauty of the memorial.

The unveiling was performed by Dr. MALCOLM DONALDSON, director of the cancer department. He said that Ronald Canti's real memorial would always be the increased research activities of the great hospital and college. Dr. Canti had been one of the first to realize the importance and possibilities of the *x*-ray installation, and had done much hard work in connexion with it. As far back as 1929 he was thinking out plans for a super-high-voltage apparatus, and he spent much time and energy in assisting to design the new building. Canti was a generous friend and a delightful companion, a man of imagination and foresight—characteristics of inestimable value in a research worker. He was an artist; so that nothing but perfection sufficed him in his work. Wide as were his interests, no subject enlisted his ardent attention more than malignant disease. He was honorary scientific secretary to the British Empire Cancer Campaign, which deeply felt his loss. To very many of the medical and lay public he would be remembered as the man who made a most wonderful scientific cinematograph film. The film, however, though a superb technical achievement, was only incidental to a carefully planned and brilliantly executed series of investigations on malignant disease, with special reference to the biological effects

of radiation. That brought him into touch with the late Dr. T. S. P. Strangeways, and a large part of his research work was done in co-operation with the research workers in the Strangeways Laboratory. Perhaps Dr. Canti's greatest contribution to science, said his colleague in conclusion, was his keenness and his ability both to stimulate and to help his colleagues. Any appeal for his help was always responded to with fruitful ideas, which often led to a solution of the problem.

EFFECTS OF ALUMINA DUST

REPORT BY THE INDUSTRIAL PULMONARY DISEASE COMMITTEE OF THE MEDICAL RESEARCH COUNCIL*

One of the chief sources of silicosis in the pottery industry has been the exposure of workers to the dust of powdered flint in the processes of placing china biscuit ware in flint preparatory to firing the ware, and removing the adherent flint from the fired biscuit ware in readiness for decoration and glazing. The employers, realizing this, experimented with various substances in the search for a substitute for flint as a bedding material, and sufficiently satisfactory results were obtained with alumina to justify, from the manufacturing point of view, its adoption for that purpose. Before coming to a decision as to this, the manufacturers asked the Home Office for advice as to whether the use of alumina would be attended by the risk of pneumoconiosis to workers exposed to it. The Home Office suggested to the Medical Research Council that this question might be referred to the Committee on Industrial Pulmonary Disease for inquiry.

There were no satisfactory data regarding the effect of alumina dust on the human lungs, but a preliminary survey of the processes in the manufacture of aluminium showed that the men employed on the reduction furnaces were exposed to alumina dust, and an endeavour might be made to determine, by examining those workers, whether that exposure had caused any injury to the lungs.

Workers Examined

Before embarking on the clinical and *x*-ray examination of the operatives who had for a number of years been exposed to the inhalation of alumina, a complete list was obtained from the British Aluminium Company of all those men in its employ, either at the Kinlochleven or the Lochaber works, who had worked for at least five years in: (1) the power-house and workshop, or (2) the refinery, or (3) the reduction factory. This list provided information for each operative with regard to his approximate age, precise occupation at the time of this "census," previous occupations, and particulars of his insurance under the National Health Insurance Acts. Similar particulars were also given for a number of past workers who were in receipt of pensions from the company. The examination was to be confined to workers in the reduction factory (and pensioners who had previously worked there), since these were the operatives most exposed to the dust. The total number of these men—that is, who had worked there for more than five years—was 145 (including eight pensioners). It was decided to examine a sample of fifty of these operatives, the sample to include men of different ages and different durations of work, in the reduction factory, so that in the event of any abnormal condition of health being found its time of onset might possibly be discovered. From the approximate ages given the numbers selected were six at ages 20 to 29, twelve at 30 to 39, twelve at 40 to 49, twelve at 50 to 59, and eight at 60 to 69, the last including two of the pensioners. Of those selected the durations of employment in the reduction factory varied between five and nearly forty years.

Any man whose previous occupation was one in which he might have been exposed to a harmful dust—for example, a slate quarrier—was definitely excluded from the sample (twelve in all). With that exception no deliberate selection of any kind was made. The men with differing durations of work required to make up the age quotas were selected entirely at random from those of each age and duration type available on the list. With the two exceptions to be mentioned the sample should therefore be quite unbiased with regard to the health of the operatives chosen. The two exceptions were: (*a*) One operative included in the original selection had been ill for some time with "an irregularity connected with the blood circulation in his legs," and, being about to undergo an operation, was not available for examination. To take his place a second choice was made from the original list. (*b*) One operative refused to be examined at the last minute, and the Examining Board accepted a substitute. The substitute happened to be one of those who had worked previously in a slate quarry, and had therefore been deliberately excluded from the sample. The remaining forty-eight originally selected were all examined.

On the whole it appears that the method of selection should ensure that the sample is quite unbiased, and should give a very fair representation of the operatives at different ages and with different durations of work. Excluding those men who had previously worked in dusty occupations the sample comprised at all ages nearly 40 per cent. of the specified population available for examination and a higher proportion in the older age groups.

Type of Examination

By arrangement with the Home Office, three members of the Silicosis Medical Board—Dr. C. L. Sutherland, Dr. A. Meiklejohn, and Dr. F. N. R. Price—made the clinical examinations at the factories. The record of examination of each worker included the following data:

Age; duration of employment, (*a*) as a furnaceman attending the reduction furnaces, (*b*) on other work in the furnace-room; nature and duration of work in any other employment; family history and personal history of illness; notes on general nutrition, the presence of respiratory embarrassment, cough, and expectoration. Measurements of the chest were made and the condition of the upper respiratory passages investigated. A complete clinical examination of the chest was made, and physical signs were recorded and the interpretation of the clinical findings noted in each case.

Immediately before the clinical examination each worker was examined radiologically at the works, by arrangement with Messrs. Portable *X*-Rays, Ltd., London, under the supervision of the members of the medical board. Radiographs were taken on 17-inch by 14-inch duplitized films with an exposure of one-tenth of a second at a distance of 6 feet, except in seven cases where, owing to thickness of the chest, the distance chosen was 4½ feet. The radiographs were examined in London by a subcommittee of the Committee on Industrial Pulmonary Disease.

Results of Investigation

A serious family history of tuberculosis was given in one case. The man himself had also suffered from pulmonary tuberculosis, and tubercle bacilli were found on one occasion in the sputum, but no clinical or radiological evidence of the disease appeared at the present examination. It seems that a tuberculous pulmonary lesion was diagnosed in this case after thirteen years had been spent as a tapper in the furnace room and subsequently the occupation of furnaceman was followed for seven years without a recurrence or progressive disease being produced.

General physique was satisfactory in the majority of the men, but poor development or some deformity of the chest was noted in eight cases. Clinical examination of the chest revealed no change from normal in forty-one of the men. In one, physical signs were found consistent with paroxysmal bronchial asthma, of which a history was given, the onset being about ten years previously.

*Members of committee: Sir Arthur J. Hall (*Chairman*), Dr. A. E. Barclay, Mr. J. C. Bridge, Professor S. L. Cummins, Dr. S. W. Fisher, the late Professor E. H. Kettle, Air Vice-Marshal Sir David Munro, Mr. R. L. Rawlinson, Professor M. J. Stewart, Dr. Cecil Wall, and Dr. E. L. Middleton (*Secretary*).

Chronic bronchitis was diagnosed in a man who had been gassed in the war and treated in hospital for four or five weeks. He had had several attacks of chest trouble since that time. In a few others slight adventitious sounds were found, with no other departure from normal.

In the last column of Table I the conclusions arrived at on interpretation of the clinical and radiological data are indicated for each age group by the letters A, B, C, and D, which have the following significance:

A.—Nothing found in the clinical or radiological examinations which suggests any changes in the lungs: thirty cases.

B.—Changes in the lungs found clinically and radiologically: five cases, in which the diagnoses were:

(1) consistent with history of previous pneumonia; (2) asthma; (3) catarrh; (4) chronic bronchitis; (5) slight fibrosis or senile changes.

C.—Changes in the lungs found clinically only: one case showed slight signs of bronchial catarrh.

D.—Changes in the lungs found radiologically only: fourteen cases. The changes in two were doubtful and in all the others they were of slight degree. Classification of the changes and the clinical findings are as follows:

(*a*) Slightly increased striation, or more fibrosis than usual, three cases—(1) occasional adventitious sounds; (2) normal; (3) flat chest.

(*b*) Evidence of old pleurisy, three cases—all normal.

(*c*) Evidence of slight emphysema, four cases—(1) very muscular; (2), (3), and (4) normal.

(*d*) Calcified glands, two cases—both big men, in both occasional rhonchi were found.

(*e*) Slight catarrh—normal.

(*f*) Catarrh: ? old pulmonary tuberculosis, right apex—normal.

TABLE I

Age Group	No. of Men Examined	Years of Work in Furnace Room	Classification on Basis of Past History and Clinical and Radiological Examinations			
			A	B	C	D
20-29	6	5-12	3	—	—	3
30-39	12	6-18	7	—	1	4
40-49	10	11-25	5	3	—	2
50-59	14	14-34	9	1	—	4
60-69	8	12-33	6	1	—	1
Total	50	5-39	30	5	1	14

Conclusions

After considering the results of the clinical and radiological examinations and the report on sickness rates the committee was unable to find, within the limits of the material included in this investigation, any evidence that the inhalation of alumina dust had caused fibrosis of the lungs.

ACKNOWLEDGEMENTS

The committee thanks the owners of the two factories at which the investigations were made, the managers and their staffs for valuable assistance in regard to the statistical inquiry and for providing facilities for the medical and radiological examinations, and the workers for their interest and co-operation. Acknowledgement is also due to Dr. A. Bradford Hill for advice on the statistical aspect of the inquiry, for selecting the workers for examination, and for providing a note on the sickness experience of the workers in alumina; and to the chief medical officer and two members of the Silicosis Medical Board, Dr. C. L. Sutherland, Dr. A. Meiklejohn, and Dr. F. N. R. Price for the skill and care they devoted to the medical examinations. The committee appreciates the success achieved by Messrs. Portable *X*-Rays, Ltd., in carrying out the radiographic work and the care and trouble they took to meet the unusual demands of this inquiry.

Sickness among Workers in Alumina

APPENDIX BY DR. A. BRADFORD HILL

In addition to the clinical and *x*-ray examinations an attempt was made to measure the amount of sickness experienced by the workers in the two factories. The list of workers, which was obtained as a preliminary to the investigation, included particulars of the approved societies to which the operatives belonged under the National Health Insurance Acts. It was found that the number of societies represented by members at these works was very nearly fifty, but a large number of societies had only one or two members there. In fact, the sickness experience of over 80 per cent. of the operatives could be obtained from only nine societies. It was decided to confine the inquiry to this number. With the assistance of the Department of Health for Scotland the nine societies were approached and kindly provided the sickness histories of the men belonging to them over the five years 1931 to 1935 inclusive. These operatives were divided into two groups: (1) men employed for at least five years previous to the inquiry in the reduction works; and (2) men employed for at least five years previous to the inquiry in the other parts of the factory—namely, the workshops, refinery, and power house. The object of investigation was to see whether the former group, exposed presumably to a higher concentration of dust in the atmosphere, showed any pronounced differences in its sickness rates from the rate experienced by workers in the other parts of the factory. The histories related to 107 men in the reduction works and to 129 in other parts of the factory. As sickness rates vary with age, a preliminary comparison of the two groups was made with regard to that factor. Table II shows that in the reduction works compared with the rest of the factory there were proportionately rather more workers at ages over 40 years and less at under 30 years. As sickness rates usually increase with age this difference may tell slightly against the operatives in the reduction works.

TABLE II

Age Last Birthday on January 1st, 1931 *	Number of Men in	
	Reduction Works	Other Parts of the Factory
Under 20	5 (4.7%)	10 (7.8%)
20–30	27 (25.2%)	46 (35.7%)
30–40	31 (29.0%)	33 (25.6%)
40–50	31 (29.0%)	26 (20.1%)
50–60	13 (12.1%)	14 (10.8%)
Total	107 (100.0%)	129 (100.0%)

* Six men in the reduction works and five in other parts of the factory entered their societies during 1931–5. They have been allocated to the age groups according to their age last birthday on January 1st of the year in which they entered.

Excluding the eleven entries referred to in the footnote to Table II there were 101 men in the reduction works and 124 in other parts of the factory whose sickness history was available for the complete five years. Thirty-six of the former, or 35.6 per cent., and fifty-four of the latter, or 43.5 per cent., had no sickness at all during the five years. The difference between these percentages is small and not more than might easily arise by chance with such small numbers. The total number of claims made over the five years (including cases of workmen's compensation) was 135 in each group. From this figure calculation of a claim rate can be made: taking the rate as the number of claims made per 100 persons per annum, it is 25.2 in the reduction works and 20.9 in the other parts of the factory (for simplification the few entries have been counted as if they were present for the whole five years; more accurate treatment makes no material

difference to the results). If the comparison be limited to illness—that is, if injuries, compensated or otherwise, be excluded—the two rates become 19.4 and 17.4. The rate is slightly higher in the reduction works.

A second rate to be utilized is the number of days of sickness per person. The total number of days of incapacity in the reduction works was 4,027, and in the other parts of the factory 2,885 ; this appears to be a large difference, but the former total includes 700 days of absence of one man due to an injury (a Workmen's Compensation Act case). If all injuries be excluded from both groups the total days lost due to illness are 2,039 and 2,050 ; the number of days per person per annum is then 3.8 in the reduction works and 3.2 in the other parts of the factory, while the average duration of a claim is 19.6 days in the former and 18.3 days in the latter.

Finally the type of sickness suffered by the two groups has been compared by means of the diagnoses recorded. This comparison is made in broad groups in Table III.

The operatives in the reduction works appear to have a rather low incidence of respiratory complaints, but taking the small numbers into account there is in general no very distinct difference in the proportional incidence of the various groups of complaints (or in the absolute incidence, as can be shown by calculation of the claim rates for each cause).

It appears from this admittedly limited material that the operatives in the reduction works experienced slightly higher sickness rates than the men in the other parts of the factory, but that no really substantial differences are revealed in the kinds of illness suffered by the two groups ; the difference in sickness incidence does not appear to be due only to the older age distribution of the men in the reduction works, for a slight excess is apparent among comparable age groups.

TABLE III

Diagnosis	Number of Sicknesses Recorded under Given Diagnosis	
	Reduction Works	Other Parts of the Factory
Diseases of respiratory system	42 (31.1 %)	59 (43.7 %)
„ digestive system ...	8 (5.9 %)	12 (8.9 %)
Rheumatism, etc.	13 (9.6 %)	6 (4.4 %)
Infectious diseases	5 (3.7 %)	1 (0.7 %)
Injuries (under W.C.A. and otherwise)	31 (23.0 %)	23 (17.0 %)
Skin (including septic) conditions	7 (5.2 %)	7 (5.2 %)
Other causes...	15 (11.1 %)	16 (11.9 %)
No diagnosis...	14 (10.4 %)	11 (8.2 %)
Total...	135 (100.0 %)	135 (100.0 %)

Nova et Vetera

JOHN MILTON'S BLINDNESS

A SUGGESTED DIAGNOSIS

Speculation continues to be rife as to the nature of Milton's blindness. It has been suggested that it may have been due to albinism (Mutschmann[1]), congenital lues (Saurat and Cabannes[2]), detachment of the retina (Sorsby[3]), and glaucoma (Stern[4]). In his account of the medical aspects of the lives of certain historical characters (of which a notice appeared in the *Journal* of June 27th), Mr. James Kemble[5] includes a chapter on John Milton and his blindness, and reviews what we know of the clinical features of the case and the diagnoses which have been made. Milton began to lose his vision at the age of 36, and by the time he was 44 he was totally blind. We know that between the writing of *L'Allegro* and the appearance of *Paradise Lost* he ceased writing poetry and produced pamphlets and books written with a wild invective quite foreign to that beauty, charm, and dignity which characterized his other work, so that Pattison wrote: " The awful majesty of Milton descends from the empyrean throne of contemplation to use the language of the gutter and the fish-market." This period of scurrilous writing took place during the eight years in which he was losing his vision. There was no change in the appearance of his eyes. Milton himself wrote of them, " Eys ; yet to all outward appearance so sound, so clear, and free from the least spot, as theirs who see furthest." He also wrote, " A mist formed on the left side of my left eye, and prevented me from seeing anything on that side," and " My forehead and temples seem to be the seat of chronic vapours, which constantly oppress and weigh down my eyes."

After reviewing the various causes which have been suggested and to which we have already referred, Kemble favours a diagnosis of glaucoma, but admits that the age of 36 to 44 is rather early for the development of this disease, and that it is a little difficult to interpret precisely Milton's statement that " a mist formed on the left side of my left eye." He points out that it seems to mean that there was a defect on the temporal side of the visual field and that in glaucoma there is peripheral contraction of the field, but this, at least in most early cases, is more pronounced on the nasal side.

It is possible, however, that there may be a different solution altogether and one which would more easily account for all the recorded facts, and suggest that the blindness may have been due to an intracranial tumour exerting pressure on the optic chiasm. We might go further and postulate the nature of the tumour, for it must obviously have been of very slow growth and ultimately have become a " dead tumour," otherwise it would have wrecked Milton's life as well as his visual pathways. Such a tumour might well have been a cyst, possibly one arising from remnants of Rathke's pouch. We have records of a case in which such a tumour, the size of a golf ball, was removed from a man aged 41. For four years he had been steadily losing his vision, and a diagnosis of primary optic atrophy had been made. The pituitary fossa was normal and there were no signs of pituitary disease other than some headache and a minor degree of polydipsia and polyuria. At the time of operation there was a large defect in the temporal field of his right eye ; his left eye was blind. The tumour was an old cyst containing cholesterol crystals. In the three years that have elapsed since its removal his right temporal field has expanded slightly but his left eye remains blind. It is very probable that had the chiasm not been explored in this case and the cyst removed this patient would by now have been quite blind, while his general condition might have altered little, if at all, as there was not at any time any increase in his intracranial tension and papilloedema had never been observed. In Milton's case the temporal field defect, with the slowly progressive loss of vision proceeding to complete blindness and the oppressive feelings in the forehead and temples and of a weighing down of the eyes, strongly suggest that he was suffering from pressure on his optic chiasm, and that this was due to a tumour such as that to which we have alluded. Hence we conclude that Milton's blindness was probably due to a suprachiasmal cystic tumour, which died but destroyed his optic nerve fibres in doing so. While it was most active the great mind forsook the beauty of the fairest of the Muses for vitriolic diatribes ; but when the tumour died the intolerant aggressive outlook fortunately died with it, the Muse returned, and *Paradise Lost* came forth. So far as we know this explanation of Milton's blindness has not hitherto been suggested.

L. R.

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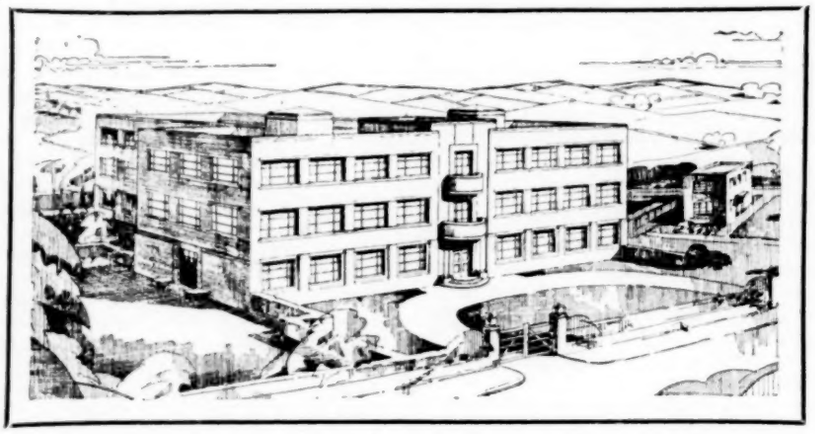
IMPERIAL CANCER RESEARCH FUND

THIRTY-FOURTH ANNUAL REPORT

The thirty-fourth annual report of the Imperial Cancer Research Fund was submitted to and adopted by the general committee at a meeting held on December 15th, Sir Basil Mayhew presiding. The Duke of Bedford is retiring from the office of president of the Fund, which he has held since 1910. He is succeeded by Viscount Halifax, Lord Privy Seal and Leader of the House of Lords. During the past year negotiations have been completed for the lease of land adjoining that of the Medical Research Council at Mill Hill. An elevation of the new laboratories which are to be built there and which will provide accommodation for all the experimental work of the Fund is shown below. A central administrative office will be retained at the Examination Hall in Queen Square, W.C.1.

Director's Report

Dr. W. E. Gye, director of the Fund, in his second report describes how it has been the policy of the Fund from its inception to maintain standard strains of a number of transplantable tumours, and to make them available for laboratories at home and abroad. These strains are used for comparison of the properties of malignant cells with those of normal cells, for the measurement of cell respiration, investigation of the action of radium, and for the testing of "cancer cures." Propagation by grafting of fragments of live cancer cells is now the routine work of the laboratories, and is carried out with careful recording of the percentage of successful transplantations, the rate of growth, and the microscopical structure of the tumours. Fluctuations in the rate of growth and in the proportion of successful inoculations are a constant feature in many transplantable tumours. Dr. Selbie has studied this problem during the past three years: his observations suggest that variations in mice in respect of their natural resistance to transplantation play a part in these fluctuations of tumour growth; this factor of natural resistance has been shown to be hereditary.



Elevation of new laboratories to be erected at Mill Hill.

Dr. Watson has continued his work on chemical reducing substances present in transplantable tumours. He has shown quantitatively that the amount of vitamin C in a transplanted tumour corresponds with the degree of chemical reducing activity of the tumour tissue. Dr. Ludford has repeated the work originally done by Professor Dustin of Brussels, which showed that the chemicals which are known to arrest mitosis in cancer cells also arrest mitosis in normal cells, and that the quantity of such substances necessary to stop the growth of a transplanted tumour is almost lethal to the animal host. The therapeutic application of those substances, which include sodium cacodylate, colchicine, auramine, and some narcotics, is obviously precluded by these findings.

According to Dr. Gye the focus of interest in cancer research has now shifted from the study of transplanted tumours to the methods of carcinogenesis. In 1930 Wieland and Dane obtained from deoxycholeic acid a complex hydrocarbon, methylcholanthrene, which when painted on mice produces cancer more quickly than any other known substance. Its interest, however, is not in the rate at which cancer follows its application, but in that it is produced from sterols which are always present in the bodies of animals, and the laboratory reactions by which it is obtained are of the kind which occur in the body under the influence of cell enzymes. Thus the conception has arisen that normal cells under abnormal conditions may produce derivatives of sterols which are possessed of carcinogenic powers. It is pointed out, however, that even if this hypothesis were proved it would not afford a complete explanation of the cause of cancer. It is now known that cancer begins as a result of a change in a single normal cell, or a small group of normal cells, which acquire the power of continuous and autonomous growth. The aetiology of cancer still presents, however, two entirely different and mainly independent aspects. First, the nature of the intrinsic cellular change conferring upon a cell the property of malignancy; and secondly, the conditions acting from without upon a normal cell which precede and bring about the intracellular change. The numerous known carcinogenic agents prepare the tissue in which they act for the intrinsic cellular change by which a malignant cell is formed from the normal cell, but they give no information on the nature of this intrinsic intracellular change. These two aspects of the causation of cancer are distinct but complementary processes.

Oestrin in Carcinogenesis

Dr. Cramer and Dr. Horning have studied the carcinogenic properties of the naturally occurring hormones. They applied a 0.01 per cent. solution in chloroform of a pure oestrogenic hormone to the skin of male and female mice over a prolonged period. Cancer developed in the mammae but not in the skin, and it developed at least as readily in the males as in the female animals. Mammary cancer has also been produced by similar cutaneous application in a small percentage of castrated males of a mixed strain, and in normal males and females of a mixed strain with a low incidence of spontaneous cancer. The oestrogenic hormone requires a longer time to manifest its carcinogenic action, and the number of animals in which cancer develops is much smaller in strains with a low incidence of mammary cancer, an observation which demonstrates again the importance of the factor of susceptibility in the genesis of cancer, and which suggests that the vague and usually unhelpful concept of disposition or diathesis may yet be rendered more precise. The various preparations of oestrogenic hormones which have been used—α-folliculin, progynon, dihydroprogynon, and ketohydroxioestrin—have produced a profound effect on the whole endocrine apparatus as

well as showing an organ specificity quite distinct from the purely local action of many of the carcinogenic agents which affect only the skin to which they are applied. Their effect upon the whole endocrine apparatus may be said to be the equivalent of a functional hypophysectomy morphologically associated with an enlargement of the anterior pituitary and a loss of chromophil cells. It is important to note, however, in view of the wide therapeutic use of oestrogenic hormones, that their carcinogenic effect can be produced only by administration over periods much longer and in doses much larger than are ever used therapeutically. There are no grounds for the fear that oestrin given therapeutically may induce cancer, though it has become clear that the oestrogenic hormones are very potent substances, with an action which goes far beyond the organs of reproduction and embraces the whole endocrine apparatus.

Filterable Tumours

Filterable tumours which have been under investigation in the laboratories of the Fund during the past year, apart from a large group of avian new growths of varied structure, include a papilloma of the cotton-tail rabbit, originally investigated by Shope, and an adenocarcinoma of the kidney of the American leopard frog. Dr. Foulds injected one group of rabbits with tissue from an avian tumour produced by the injection of dibenzanthracene, and a second group with cell-free extracts. After a sufficient number of doses had been given the sera of both groups were tested for their power to neutralize the virus of the Rous sarcoma. It was found that with both groups of sera almost complete neutralization occurred. The provisional conclusion from this experiment is that although a cell-free filtrate of a chemically induced tumour is not able to start a fresh tumour, it nevertheless contains an antigen which is present in active filtrates of the Rous tumour, and which is associated in some way with the activity of the cell-free filtrate. It is probable, but it is not yet proved, that this antigen is the actual tumour virus. There is, then, a definite interrelationship between the filterable and the chemically induced tumours.

A recent experiment which is being repeated and modified in the laboratories of the Fund is the one devised by Peyton Rous, in which he injected the rabbit papilloma virus intravenously into rabbits which had been painted with tar for about three months. A fortnight later numerous highly malignant cancers developed in the tarred areas, grew rapidly, invaded the internal organs of the animals, and finally caused death from general carcinomatosis. The simplest interpretation of this experiment is that the skin cells are so altered by tar that they are not merely prepared to accept or "fix" the papilloma virus, but are also in the state requisite for the immediate manifestation of malignancy.

Radiotherapy

It is now known that cell and tissue responses to irradiation represent the end-effects of a series of physical and chemical changes. The discovery of the nature of these primary changes is of paramount importance, since an exact knowledge of the fundamental effects produced by irradiation on the processes of cell life might lead to a more effective system of radiotherapy. Irradiation damages respiration at body temperature and glycolysis at low temperature. It may be said that the utilization of carbohydrates, either by oxidation or splitting processes, is inhibited by irradiation, and it has been shown recently by Mr. Crabtree that secondary metabolic processes arise as a result of this inhibition, in which nitrogenous products, probably proteins, are broken down to supply energy to the partially damaged cells. The effect of irradiation on glyoxalase has also been studied, and this enzyme has been proved to be very resistant to x rays, a further demonstration of the widely different vulnerability of the varying intracellular enzyme systems. Experiments by Dr. Cramer in irradiating malignant cells with sublethal doses of radium have shown that the effects of small doses are cumulative and that the period of recovery from slight damage is longer than was thought.

Reports of Societies

THERAPEUTIC METHODS OF ARRESTING HAEMORRHAGE

At a combined meeting of the Sections of Therapeutics and Pharmacology and of Medicine of the Royal Society of Medicine on December 8th the subject of discussion was therapeutic methods of arresting haemorrhage. Dr. DOROTHY HARE presided.

Professor A. ST. G. HUGGETT opened by outlining the subject from the physiological and pharmacological point of view. He said that the main principles obtaining in the treatment of haemorrhage might be subdivided into surgical and medical. In dealing with the medical methods available two things had to be borne in mind. In the first place, any constitutional underlying cause—for example, scurvy—must be removed. In the second place, there were certain therapeutic steps which could be taken after the haemorrhage had occurred. These fell into two main classes, involving either the diminution of the calibre of the leaking vessel or the consolidation of the blood by either natural or artificial means. The restraint of the flow of fluid blood could be brought about mainly by lowering the pressure of the blood in the vessel. External means of compression by bandages or some other local treatment might be used, but fundamentally the flow of blood depended on the pressure. Arterial blood pressure depended upon three things: the volume of the circulating blood itself, which varied but little, even after somewhat severe bleeding; the output of blood from the heart, which depended first upon the inflow into the heart, and this in turn depended on the pressure within the veins, which again depended upon two main accessory factors. The heart alone without accessory pumps would be unable to drive the blood all round the body, and there were two accessory pumps, commonly spoken of as the respiratory pump and the cardiac. Boyle's law applied to the body as much as to any physical phenomena. If the volume of the chest enlarged the pressure within must fall, and when the diaphragm descended in respiration it compressed the contents of the abdomen. The net effect of increased respiratory movement in violent exercise was to increase the venous pressure. Another factor was muscular contraction; every time a single muscle contracted its vessels were compressed by the muscular fibres, and the blood was driven by contraction of the muscles forward from the arterial side into the venous side. An increase in the heart rate produced little effect on arterial blood pressure unless there was a concomitant increase in the venous pressure. A third important factor in the maintenance of arterial blood pressure was peripheral resistance, commonly described as dependent on the viscosity. The first main point concerning the maintenance of arterial blood pressure and the prevention of blood flow was to keep the pressure down, and therefore everything which tended to cause a rise of pressure must be stopped. Rest was the first desirable factor. Muscular rest was, above all, the thing to be aimed at, even to the extent of relaxing the muscles to an abnormal degree by the use of morphine and other hypnotics. Adrenaline was of use where it was desired to produce a local vaso-constriction at the site of haemorrhage, when its generalized effect would be absent. The second factor was the consolidation of the blood. The term "coagulation" he restricted to the natural change in the blood. The blood could be rendered

solid by artificial means such as protein precipitants. The question of blood-clotting was always recurring, and gave a great deal of trouble, because it was overloaded with theories, and, worse still, with names. The speaker briefly discussed these theories and the value of the main coagulants used in medicine.

Guiding Principles in Treatment

Dr. MAURICE DAVIDSON said that the inevitable additions of recent years to the medical curriculum had made the task of a teacher of clinical medicine one of increasing difficulty. Important as it was for the student to grasp the basic physiological principles which were the foundation of therapeutics he was apt to receive a somewhat rude shock when he was first brought into close contact with the realities of medical practice. To say that the treatment of haemorrhage depended upon its cause was to reiterate a platitude of medicine. This he ventured to do only as a warning against the occasional tendency, even in these enlightened days, to deal with the symptom rather than the underlying disease, especially in cases of emergency and in the presence of anxious and importunate relatives. In such circumstances the correct conduct must be the outcome both of proper scientific training and of that natural common sense which enabled the practitioner to deal adequately with a sudden and unexpected situation. From a clinical standpoint the duty of the practitioner in a case of haemorrhage might be summed up under the following simple headings: (1) he must make up his mind as to the differential diagnosis, estimating at the same time as well as he could the significance of the symptom in relation to the disease of which it was an expression ; (2) he must endeavour to assess the value of any proposed therapeutic method in accordance with the immediate needs of the case and having regard to all the circumstances of the individual whom he had to treat.

Bleeding might originate from some portion of the respiratory, alimentary, or genito-urinary tract. Apart from these, it was necessary to consider those forms of bleeding from any part of the body which were associated with the primary disorders of the haemopoietic system, and with certain virulent bacterial infections. The commonest cause of haemoptysis was pulmonary tuberculosis. Here haemorrhage might occur at any stage of the disease, and might be of any extent, from a few streaks of blood to a pint or more. Although its occurrence was a source of alarm it was seldom that life was lost from this cause through lack of application of the appropriate treatment. The administration by mouth of fairly large doses of ergot was difficult to justify on any basis of experimental pharmacology, and yet the cessation of the haemoptysis within a few minutes of taking this drug was a phenomenon frequent enough to suggest that it was not always a coincidence. Intravenous injection of a 10 per cent. solution of calcium gluconate and the simultaneous intramuscular injection of haemoplastic serum would seem to have a more rational basis ; certainly the successful results of such treatment appeared to be borne out by practical experience. In hyperpiesis, bronchiectasis, new growths of the bronchus, and so forth, the treatment was that of the disease itself, haemorrhage in these cases seldom calling for any specific measures directed to the symptom alone.

It was in disease of the alimentary tract, especially gastric and duodenal ulcer, that the treatment of haemorrhage was at once so difficult and so important. Lives had been lost from gastric haemorrhage which would have been saved through timely surgical intervention at the optimum moment after suitable blood transfusion. This was more especially true in cases of long-standing chronic ulcer, in which the prominent risk was that of haemorrhage. The technique of blood transfusion in these circumstances and the intimate co-operation between physician and surgeon were of paramount importance. When surgical treatment was not contemplated the value of blood transfusion as a remedy for the haemorrhage, apart altogether from the replacement of blood lost, was considerable. Haemorrhage associated with other gastro-intestinal lesions, such as growth or acute obstruction, demanded treatment of the responsible cause, mainly a matter of major surgery, and the same might be said of most genito-urinary haemorrhages, and of bleeding from various gynaecological causes. Two exceptions were the haematuria which was due to some focal infection, and the various instances of menorrhagia or metrorrhagia not associated with gross pelvic disease. Treatment of the focal infection was mainly a question of the discovery and elimination of the focus, while the other cases were not infrequently an expression of some common disease of general medicine, a primary anaemia, for example, to which the main therapeutic effort must be directed.

Coming to the general group of diseases in which haemorrhage from various parts of the body was a prominent symptom, Dr. Davidson said that this included not only the primary blood diseases, but also various infections, especially streptococcal, leading to serious changes in the blood state. The value of blood transfusion in these conditions was undoubted, but this therapeutic weapon was not without its disadvantages. Despite careful grouping, it was not always possible to guarantee the patient against a reaction. He proceeded to give an example of the kind of practical difficulty which he had in mind.

CASE REPORT

A young woman was sent to him for advice as to the treatment of purpura. On examination she had the marks of a recent purpuric rash, which had been distributed generally all over the body, and was still evident upon the limbs. The loss of blood at the periods was usually excessive, but apart from these evidences of a haemorrhagic tendency she did not complain much of her health. It occurred to him that some focal infection might be responsible for her symptoms, and she was found to have large, slightly oedematous, unhealthy-looking tonsils. A swab from the tonsils yielded a pure growth of haemolytic streptococci. He had it in mind to give her very small doses of autogenous vaccine guarded by protective injections of anti-streptococcal serum, and at the appropriate moment to have the tonsils dissected out. Before any active treatment was started, however, she began to bleed from the uterus. About the same time or very shortly after she had a severe epistaxis, and the blood count showed a serious drop in haemoglobin. The condition was improved for a time by local plugging and the giving of a blood transfusion, but further haemorrhage occurred and was repeated. In spite of many transfusions she bled profusely from the nose, the gums, the palate, and the uterus, and died eventually about two months after admission.

He quoted this case, one of the failures to which he frankly confessed, as it was by such examples that one learned the most valuable lessons in medicine. He did no think that any question of surgical treatment could reasonably have been undertaken while this patient was in hospital, though he was inclined to believe that, had her tonsils been removed months before, this unfortunate sequence of events might have been prevented.

Professor A. E. NAISH (Sheffield) referred to a method of controlling haemorrhage in haemophilia concerning which he, with Dr. W. A. Temperley and Professor G. A. Clark, had given a full account in the *Lancet* of November 14th (p. 1142). From egg-white incubated at 37° C. for several days in the presence of potassium bromide a substance was extracted which on addition to blood *in vitro* was found under certain conditions to lead to the formation of a clear structureless gel which did not shrink like ordinary blood clot. It had been found possible on using this substance by intravenous or intramuscular injection to reduce the clotting time of the blood and to control haemorrhage in haemophiliacs. Even when injected in large quantities this substance was never found to produce either local or general intravascular clot, nor did it appear to cause any other disability. A derivative of mucic acid had been found to have similar properties. Professor Naish described certain cases which had been successfully treated—successfully, that is to say, in the same sense as diabetes was treated with insulin. Repeated injections were necessary to control the tendency to haemorrhage.

Dr. DOROTHY HARE mentioned the case of a young man, a haemophiliac, who had returned to London after being at Sheffield under this treatment, and had since then been treated with material from the same laboratory. He had received injections at ten-day intervals throughout the summer and autumn. She showed a chart indicating the results of the treatment. The clinical appearance of the case and the patient's reactions suggested a curative substance, although the haemophilia was not controlled for a very long period and the injections had to be repeated. Mr. J. D. CAMBROOK mentioned the use of snake venom in the case of haemophiliacs who had to undergo extraction of teeth. In a particular instance of which he spoke the coagulation time had been reduced from half an hour to half a minute, and the clot produced was a very strong and tough one instead of the poor one found in haemophiliacs. Used as a local styptic the substance did no harm to the wound. With regard to the new injection treatment mentioned by Professor Naish he had not actually used it, but he had discussed it with workers who had had experience of its value, and the results appeared to be extremely good. Apparently, however, it could be used only by injection, not as a local styptic no matter how gently applied. Dr. GEORGE GRAHAM confirmed the value of snake venom in extraction of teeth in the haemophiliac.

X-RAY DIAGNOSIS OF SINUS THROMBOSIS

At a meeting of the Section of Otology of the Royal Society of Medicine on December 4th, with Dr. DOUGLAS GUTHRIE in the chair, Dr. PAUL FRENCKNER (Stockholm) read a paper on sinography, a method of radiography in the diagnosis of sinus thrombosis. This method of investigation aims at determining the existence of an obstruction to the blood stream in the dural sinuses or in the jugular vein, and is accomplished by taking an *x*-ray picture during the injection of a roentgen-opaque substance into the sinuses. The technique is as follows. By means of specially made trepanning instruments the superior longitudinal sinus is exposed. Into this vessel a roentgen-opaque substance is injected, and simultaneously *x*-ray photographs are taken. If there is any obstruction to the blood stream in any of the "evacuary" sinuses the picture of the roentgen-opaque substance shows where it is to be found. Anatomical variations and anomalies must be carefully considered in assessing the value of the radiographs. The paper was discussed by Dr. GRAHAM HODGSON and Mr. FORSTER. Mr. C. S. HALLPIKE read a paper on some recent work on the electrical response of the cochlea and auditory tracts.

Mr. E. WATSON-WILLIAMS showed cases and skiagrams of complete absence of mastoid-cell development on one side and well-developed cells on the other; the question was whether the failure of cell development indicated an infection in early infancy.

CAESAREAN SECTION

A meeting of the North of England Obstetrical and Gynaecological Society was held in the University of Sheffield on November 27th, with the president, Dr. RUTH NICHOLSON, in the chair. A discussion was held on Professor A. M. CLAYE's paper on the indications for Caesarean section (presented at a previous meeting of the society).

Professor Claye had said that the indications for Caesarean section had been until fairly recently (1) contracted pelvis, (2) tumours obstructing labour.

There were certain considerations with regard to the classical operation: first, the high mortality, at the optimum time 1.5 per cent., late in labour 9.4 per cent., and after attempts at delivery 26.5 per cent.; secondly, the uterine scar was potentially weak, with a tendency to rupture should subsequent delivery by the vaginal route be attempted; and thirdly, should uterine infection occur general peritonitis might result with a consequently high mortality. For this reason craniotomy was reputed to be safer than late classical section.

With the lower segment operation the situation was different. There was a comparatively low mortality. Mr. Claye quoted the figures of Bailey, Evers, Marshall, and Walsh, and those from the Leeds Maternity Hospital, giving a mortality of 1.6 per cent. in 559 cases, though many of the sections were performed late in labour or after intervention. The operation was undoubtedly much safer than craniotomy, mortality figures from representative hospitals regarding the latter operation giving a figure of 9 per cent. The scar in the lower segment was much less dangerous than that in the classical operation. Professor Claye wondered, in view of the good results obtained by lower segment section, whether the indications should be widened. There seemed to be no reason for confining section to one cause of dangerous delay—namely, contracted pelvis.

He thought it might be used occasionally in cases of primary inertia, including colicky uterus, or in poorly flexed occipito-posterior cases where mother and child might be in danger long before full dilatation of the cervix. Section in such cases carried less risk than trachelotomy or manual dilatation.

Other Indications

Other indications in a series of lower segment operations he had performed were heart disease, brow presentation, fibroids, scarred cervix, and carcinoma of the cervix. In heart disease section and sterilization were performed if the patient was considered fit to stand the operation but not to endure another pregnancy. In a series of classical sections indications other than contracted pelvis were placenta praevia, fibroids, toxaemia, accidental haemorrhage, repeated transverse lies, previous complete tear, previous puerperal insanity, breech presentation in an elderly primigravida, and repeated prolapse of the cord. Mr. Claye felt that sections on certain of these indications were only justified on rare occasions. In the placenta praevia, for example, section was considered if the patient was a primipara in good condition, the child being alive and well developed, and the placenta central. It was often said that it was important to preserve the obstetric art, and that if all difficulties were treated by Caesarean section the art would disappear. He did not suggest that all difficulties should be dealt with by section, but only a few carefully selected cases. He thought that our primary object in obstetrics should not be the preservation of the obstetric art, but the achievement of the best possible results for mother and child irrespective of method.

Selection of Cases

The discussion was opened by Mr. W. GOUGH (Leeds), who stressed the dangers of the unnecessary performance of the operation. He deplored the growing tendency to treat any obstetric difficulty by section. The operation, though easy, was by no means to be considered as trivial, and a low maternal mortality figure was not the sole criterion of success. There was always the possibility of subsequent disability from, for example, adhesions, herniae, or fistulae. He felt that section could rarely be justified as a method of treatment of primary inertia, though no doubt every obstetrician could look back on cases where he had eventually wished that he had performed a section. The trouble was that we could never foresee how any given case would finally turn out. As a rule, however, they did well without intervention. Where fibroids were present it was advisable to wait until the patient was well on in labour, as they often went up out of the way as the lower segment took up. Mr. Gough did not himself perform Caesarean section in frank breech cases unless the pelvis was contracted. He made use of the operation in picked cases of placenta praevia, but did not agree to it as a routine. He rarely adopted it as a method of delivery in heart disease.

The PRESIDENT drew attention to the fact that the number of sections for contracted pelvis was being reduced by making use of trial labour followed by the compara-

tively safe lower segment operation in cases of failure. She thought that there was a place for section in the case of an elderly primigravida with a large child. Mr. A. GOUGH (Leeds) made the point that in a given case the indications for section were often multiple. He quoted a primipara of 44, a fortnight past her calculated date, with a large child, a slightly diminished conjugate and rigidity of the soft parts. None of these factors alone would be sufficient to justify section, but taking them all into consideration one would not hesitate to operate. With regard to uterine inertia he could not accept that by itself as a sufficient indication. Occasionally, however, the presence of other abnormalities such as disproportion, toxaemia, or placenta praevia might serve to turn the scale in favour of operative delivery.

Dr. C. H. WALSH (Liverpool) reviewed a long series of sections performed at the Mill Road Infirmary and Smithdown Road Hospital, Liverpool. He preferred the lower segment operation except in cases where there were large veins present. He considered that Caesarean section was rarely indicated in heart disease. Mr. ST. GEORGE WILSON, in reference to trial labour, thought that the usual approach to the question as an anatomical consideration of the presenting part and the pelvis was quite wrong. The test was really a physiological one. He also thought that the term "uterine inertia" could with advantage be replaced by the more expressive "disordered uterine action." Mr. P. MALPAS (Liverpool) considered that a discussion of massed results of Caesarean section possessed little advantage. Every obstetric case presented individual risks and problems, and the selection of Caesarean section as the method of delivery must be based on a consideration of the dangers and results of all the other methods available in the particular case—natural forces, forceps, version, or embryotomy. The lower segment operation, while minimizing the incidence of puerperal infection, did not confer absolute immunity against peritonitis. There were some cases in which the protection afforded by the lower segment operation should be supplemented by drainage.

General Discussion

Mr. C. M. MARSHALL said that it was now about one hundred years since Baudelocque had expressed the opinion that Caesarean section was being performed much too often. Almost every authoritative statement since that time had been prefaced by remarks of a similar kind. Mr. C. G. Walsh's excellent figures were only some of many that showed conclusively that the modern improvements in the operation were greatly increasing its safety. It was only natural, then, that there should develop a somewhat wider scope for its application. He thought it would be safer to explore all the possible ways in which the technique of the operation could be improved. He had now carried out the lower segment operation in 170 instances without any maternal death. Spinal anaesthesia, though its risks were higher in this than in other pelvic operations, endangered the life of the mother much less than general anaesthesia. In all severely ill women, whose reactions to lumbar anaesthesia were uncertain, he now employed local anaesthesia. The outstanding results recently published by Daily from the Chicago Lying-In Hospital clearly showed the decided advantage that would follow a wider adoption of this latter method. The speaker then referred to some special points in the technique when using the lower segment operation in placenta praevia. After the abdomen had been opened the presentation was converted to a breech, and then, making a small transverse incision in the lower segment, a leg was pulled through. Traction on the leg was kept up while the uterine incision was being extended, and in this way complete control of haemorrhage could be obtained. If the breech could not be made to present and the initial small incision involved the placental site the wound should be quickly extended with the index fingers, the hand inserted, and a leg secured.

Dr. E. A. GERRARD (Manchester) made reference to Banister's contention that in only 50 per cent. of cases do women who have had a Caesarean section performed subsequently become pregnant. He thought that this point was all too often overlooked. Professor Claye, in reply, emphasized that he considered Caesarean section the right treatment for primary inertia or an occipito-posterior position only in the rare cases where maternal or foetal distress was present with a partially dilated cervix. He used the term "inertia" of any cases with inadequate pains in which there was no other evident cause of delay. He congratulated Mr. St. George Wilson on his definition of trial labour.

AIR RAID PRECAUTIONS

Measures for Civilian Protection

At a meeting of the United Services Section of the Royal Society of Medicine on November 14th, Surgeon Rear-Admiral J. FALCONER HALL presiding, an address on air raid precautions, with special reference to their medical aspects, was delivered by Major H. S. BLACKMORE of the Air Raid Precautions Department of the Home Office.

Major Blackmore said that the Government decided about eighteen months ago that the matter of civil air raid precautions had to be properly organized, and the special department of the Home Office was instituted. The first responsibility which the Government took upon itself was education and training, and for that purpose a civilian anti-gas school was started in Gloucestershire for the training of instructors. The classes lasted for a fortnight, but there were shorter classes, designed to give a bird's-eye view of the situation, for those whose job would be executive, such as chief constables, medical officers of health, and borough surveyors. The department had issued or was in process of issuing memoranda and handbooks. Handbook No. 3, which would be published within the next two months, had been designed as a clinical manual specially for the medical profession.

The Government had also undertaken the collection and storage of respirators, protective clothing, and antidotes such as bleach. These were being handled centrally, and stocks gradually accumulated against the day of emergency. The department had its own factory in Blackburn for making civilian respirators, which it was intended to issue in sufficient numbers for the whole population. Three main storage depots had been organized, and these would be gradually multiplied until it became possible to store in such a way that the issue of respirators to every individual could be carried out within from twelve to twenty-four hours. Members of the public would be able to go to the depots, be fitted with respirators of proper size, and grow accustomed to their use. Bleach powder presented a difficulty, because the commercial use of it had steadily diminished, but the trade was now being stimulated, and it was intended to collect enough stocks to meet the demands, which must be very great if ever the menace should arise.

The Task of Local Authorities

Apart from these arrangements, the details of the planning were placed upon the shoulders of local authorities. Officers of local authorities knew their own area, problems, and were the best people to handle them. The response in the country had been extremely good. Some were not quite as keen as could be wished, but there was now only one local authority of reasonable size which was absolutely refusing to co-operate. The department had no compulsory powers; the whole thing was voluntary. The local authority was asked, first of all, to choose an individual or committee to go into the problems associated with air raid precautions as they appertained to the area. The central Government department dealt only with county and county borough councils, and these in their turn dealt with the smaller formations of local government. The first thing to be undertaken was a general survey of the area from a geographical, topographical, and population point of view, and subdivisions were made to suit the convenience of the locality. The plan in each area included police, fire brigades, rescue

decontamination, and medical parties, and air raid wardens. The medical officer of health was as a rule in charge of the medical arrangements. As the nation would be at war it was felt reasonable to adopt those general plans which had been found acceptable and satisfactory in the experience of the fighting Services. The local authority was asked to arrange for bearer or first-aid parties, first-aid posts, casualty clearing hospitals, and base hospitals, and for a linked-up ambulance service. The British Red Cross Society and the St. John Ambulance Association, with the St. Andrew's Brigade in Scotland, had accepted the responsibility of obtaining and training the personnel for the first-aid parties and first-aid posts. It was recommended that the first-aid party should consist of four bearers with a stretcher, each bearer to have a first-aid pouch and each party a haversack. From twelve to fifteen such parties were recommended for every 100,000 of the population. A full round-the-clock service was anticipated, at any rate in urban areas, and this meant relays, with depots, situated near the first-aid posts, where the personnel could be lodged.

With regard to rural areas it was considered that communities of less than 1,500 people should not have definite arrangements of their own, except in very skeleton form, but they should be in close relation with the nearest urban organization, for which purpose certain reserve parties in the urban area would be mobile. Every urban district of whatever size should have within its compass a definite area of the surrounding rural district.

First-aid Posts and Hospitals

The first-aid posts, where also the decontamination of individuals would be carried out, were based on the estimated requirements for mustard gas casualties. Mustard gas called for extremely rapid cleansing. Some arbitrary figure had to be fixed, and accordingly it was advised that first-aid posts should be situated within two miles of each other, so that any casualty should not be more than one mile away from cleansing facilities. Even after cutting down the accommodation as much as possible, allowing in the reception room only fifteen square feet per head for unwounded casualties, fifty square feet for stretcher cases under treatment, and thirty square feet for stretcher cases awaiting treatment, a first-aid post in a fully populated urban district would require something like 8,000 square feet of floor space. When the place had been selected two main internal divisions had to be made—the first as between the sexes, and the second as between those who were contaminated with mustard gas and those who were not. Working with both the collecting parties and the first-aid posts, it was hoped to have an organization of ambulance transport. The number of ambulance vehicles in the country was relatively small, and these would be better employed in the evacuating rather than in the collecting zone. In the latter some improvisation would best meet the case, and a fitment had been made which would enable stretchers to be carried on a tradesman's van.

As to the casualty clearing hospital, the scheme visualized that any hospital which was to receive air raid casualties must be capable of giving them full hospital service, including urgent surgical attention. Certain areas such as London were obviously liable to repeated attack, and it would be unreasonable to retain casualties in hospitals in those areas. Therefore it was proposed to elaborate schemes for the removal of casualties out of the primary danger zone. The base hospitals for this purpose could, of course, be situated anywhere provided they were within range of transport. Certain localities were difficult, such as an area with a strip of coast heavily populated and behind it nothing but open moor. There would be nowhere to take the casualties within the jurisdiction of the local authority, unless large hospital accommodation were improvised, and such improvisation was almost impossible from an air raid point of view.

The problem of staffing the casualty clearing and base hospitals called for a great amount of co-ordination in view of the demands of the ordinary sick, the problems of the Services themselves, and the new demands of casualties anticipated from air raid action. The total numbers that would be called upon for service were enormous, and there were no organized bodies, apart from voluntary aid, on which to draw. Efforts were now being made throughout the country to enlist volunteers. Hitherto the work had not been carried further than the local authorities, but the stage was being reached when an appeal would have to be made to the general community for the volunteers necessary to carry out these duties.

The medical profession was an extremely important factor in the success of the arrangements. One very serious thing to be anticipated in an air raid was panic and loss of national morale, and it was because the medical profession was such a stay and prop to the national morale that it was desired to get their training well forward. With that in view sixteen medical men who had been specially trained at the civilian anti-gas school had been made whole-time employees of the Government, and were stationed in various parts of the country giving courses of instruction to other doctors, to medical students, and to nurses. In Birmingham practically the whole of the fourth- and fifth-year medical students of the University had completed the course. This side of the work, so far as the doctors were concerned, was being undertaken under the auspices of the British Medical Association ; and the College of Nursing, the matrons of the large hospitals, and the deans of the medical schools were co-operating.

Colonel E. M. COWELL gave some account of the organization in Surrey. The medical service personnel required to be organized on a basis of 1 in 50 of the population, which in Surrey meant 25,000 people serving in one respect or another. The non-medical personnel rescue parties required 1 in 25, or in some parts 1 in 30. Germany already had an air defence corps of 1 in 6. The whole population had to be instructed what to do in air raids and how to wear a mask. He was president of the Surrey Branch of the British Medical Association, and had persuaded his five Divisions each to set up an Air Raid Precautions Subcommittee, and these were functioning all over the county. Their functions were threefold: liaison with the medical officers of health in finding the doctors who were willing to give up so much time in the event of air raids ; supervision of the education of doctors (about 300 doctors had already taken the course of gas lectures in Surrey), and finding lecturers for the Red Cross and St. John's.

Questions and Answers

Asked whether it was the intention that not only actual casualties but people who had had gas sprayed on their clothing should go to the first-aid centre, Major BLACKMORE said that facilities for personal cleansing would be provided at the first-aid posts.

A member pointed out that in Handbook No. 1, where the necessity of washing the eyes was stressed, there was an advertisement of a patent preparation for this purpose. He thought it a pity that this was included because it would lead to confusion. People should be encouraged to wash the eyes with water at once, without waiting for a lotion. Major Blackmore entirely agreed with the speaker. At the first-aid posts arrangements would be made for eye douching.

In reply to another question he said that the first-aid posts would be structurally protected against splinters, sand-bagged, and gas-locked. The question of an alternative water supply was being investigated by certain local authorities in view of the possibility that an air attack might destroy a supply. Some provincial water supplies might be made available for contiguous areas, but in London at present no practicable proposition had appeared.

A member questioned the adequacy of the recommendations regarding gas-proof rooms. Major Blackmore replied that experiments had been conducted at the anti-gas school in a series of telephone kiosks, and the students, following the simple instructions, had arrived at fairly satisfactory results. If gas was not absolutely kept out

at least it was kept out sufficiently to maintain the inside air respirable and non-toxic. But there was, of course, the second line of defence, for the inhabitants of the gas-proof rooms would still have their gas masks. It could not be hoped to provide bomb-proof shelters for the whole population ; that was almost out of the question as an engineering procedure. Dispersal of the population and taking cover were the greatest safety factors. In the last war the greatest air raid casualties occurred in the open air or in large buildings where considerable numbers of people were congregated.

Asked with regard to protection for small children, Major Blackmore said that there was a real physiological difficulty in the case of children under 5 years of age, because, while the resistance to the breathing with the gas mask was very slight, it was enough to defeat the respiratory endeavours of the small child. A perambulator cover had been elaborated with a device for securing a fresh air supply by means of a pump. But a perambulator was not an easy thing to manipulate in and out of buildings, and it had other disadvantages. The whole question of the protection of small children was being very closely studied.

A final question was whether cellars were better than ground-level rooms for gas-proof purposes. Major Blackmore said that if a cellar was used its gas-proofing must be definite and complete because of the tendency of gases to find a low level, and there must be an alternative exit. His own preference would be for the first floor, which was out of range of flying splinters, and somewhat out of range of the gas cloud ; which gave a fairly easy access to the open, and was not subject to danger from flooding.

INFLUENZA

At a meeting of the Pathological Society of Manchester on December 9th, with Dr. T. H. Oliver presiding, Dr. R. W. Fairbrother delivered an address on influenza.

Dr. Fairbrother said that the recent claims that influenza was primarily a virus disease were of such fundamental importance that it was necessary not only to examine them in detail but also to consider their probable significance. Influenza was a condition which might manifest itself in diverse forms ; the most satisfactory classification was into three main types—pandemic, epidemic, and sporadic—the last being a vague group which undoubtedly embraced cases other than true influenza. Evidence supporting the virus theory was: (1) the isolation of the virus only from cases of epidemic influenza, the viruses isolated from various parts of the world—London, America, Australia, and Russia—being immunologically identical ; and (2) the presence of anti-viral bodies in human sera: these could be readily detected by neutralization and complement fixation, the latter being the simpler test. A large percentage (50 to 60) of the normal adult population of Manchester possessed antibodies to a reasonable titre. This suggested previous infection with the virus. The titre given by the serum of convalescents tended to be slightly higher than that given by normals. Antibodies against the swine virus were also present. Available information seemed to show that the swine virus was probably the human virus modified by prolonged propagation in swine.

With regard to the significance of these observations it was possible that the wide distribution of antibodies in the population might account for the absence of epidemic influenza from the Manchester district in the past few years. Attempts had been made to utilize the living virus as a prophylactic agent ; it was too early to assess its value in this respect, but it was interesting to note that on intramuscular injection of the living virus no discomfort was experienced. An antiserum had been prepared in the horse, but while this contained a relatively high antibody titre its value as a therapeutic agent in human influenza was doubtful. Thus the results so far obtained had no immediate practical value, and while there was no doubt that great progress had been made there still remained much to be done.

England and Wales

The University of Leeds

Anything that concerns one department of a university concerns each, for is not a university "one and indivisible" like the French Republic? Shortly after the coming of age of the Leeds University, dating its birth as an independent university from the time of the disruption of the Victoria University with its three colleges at Manchester, Liverpool, and Leeds, a great expansion scheme was devised and an appeal for generous support was made to the public of Yorkshire. This has met with a generous response, and there is no Faculty of Leeds University which has not reason to be gratified by the advantages which have come to it in consequence. The extension of the medical school with its excellent accommodation for the department of physiology ; the building of the Institute of Pathology, rendered possible by the generosity of the late Sir Algernon Firth ; and the building of the Dental School in close proximity to the medical school are all the expression of this generous response. These departments, situated close together and close to the General Infirmary, are not far from the main University buildings, and it is here that the transformation is most striking, for by the time the extensions are completed the old buildings will be completely surrounded by those which are in process of construction. Already the departments of chemistry, of physics, and of engineering have been satisfactorily housed, and others are in process of development. Some weeks ago the Archbishop of Canterbury opened the buildings of the Brotherton Library, one of the most striking and beautiful parts of the University. This was the gift of the late Lord Brotherton, who gave £100,000 to the object and also arranged that his valuable and unique collection of books should be housed in a special part of the library and be freely accessible under reasonable conditions to those desirous of study. One great part of the extension scheme earnestly looked forward to but yielding in priority to those more urgent requirements which have been mentioned is the provision of the central block to form the main architectural feature of the buildings. This is to face down Woodhouse Lane, and it will be the main entrance to the library and to the administrative departments. This is now to be carried out, thanks to the great generosity of Mr. F. Parkinson, chairman of Crompton, Parkinson, Ltd., of Leeds and Guiseley, who has offered the sum of £200,000 for the purpose. Mr. Parkinson was a student of the Yorkshire College and Leeds University from 1903 till 1906, working in the department of electrical engineering. After ending his apprenticeship with a firm of engineers he started business on his own account with a very limited capital, and has achieved great success and distinction. Some time ago Mr. Parkinson gave a sum of £50,000 to found scholarships for promising students, and in his letter to the Vice-Chancellor announcing his most recent gift of £200,000 he stated that he had been encouraged to take action by the evidence he had had of the great amount of good which these scholarships had effected. In acknowledging this munificent gift the Council of the University make the following comment:

"The pleasure which such a munificent benefaction must in any circumstances have given to the University and to Yorkshire is naturally increased by the knowledge that it is inspired by the affection of an old student for his university."

These are words full of truth, for surely there can be no better way in which a student can show his gratitude to his university than by such action. When the University celebrated its majority in the year 1924 one of the senior members of the staff who was asked to speak on the occasion made an appeal for support, and, addressing more specially the past and present students, he modified the words of Musaeus and said: "If from the golden horn of plenty blessing and abundance flow to thee, then think of—the University of Leeds." Let it be hoped that other requirements of the University may be met by others who may follow the noble example of Mr. Parkinson.

The College of Nursing

On December 10th Professor John Fraser of Edinburgh presided at a meeting of the College of Nursing to celebrate its twenty-first year of existence. The secretary, Miss Frances Goodall, described the activities of the college, which she said had been founded by Dame Sarah Swift with the objects of improving the conditions of nursing education, the conditions of work, and the opportunities for social intercourse in the nursing profession. One of its most important activities had been the establishment of a superannuation scheme. The college had 28,000 members and 106 branches. The chairman said that the evolution of the nursing profession was in some respects the most impressive development of our time. When Sidney Herbert wrote to Florence Nightingale in 1854, he could not have foreseen the full significance of his epistle. In the years which had passed since the Crimean War nursing had found its feet, but if its efforts were to be efficient some measure of organization must guide its activities. Those who had foresight instituted the General Nursing Council, which had to deal with administration, State legislation, and ethical problems. Something more personal, however, had been required, an organization which brought individuals together, stimulated them, and offered them substantial help, and these requirements had been fulfilled by the College of Nursing. They were therefore celebrating the twenty-first birthday of a most efficient and excellent organization, and the future of nursing—practical, scientific, and ethical—was safe in its hands.

The Medico-Legal Society

The annual dinner of the Medico-Legal Society was held at the Trocadero Restaurant on December 9th under the presidency of Mr. C. Ainsworth Mitchell. The usual toast of "Medicine and Law" was proposed by Sir Holman Gregory, Recorder of London, who addressed himself to the problem of the criminal, and suggested from his fifty years' experience of the courts that 98 per cent. of the prisoners who came up on serious charges were in one sense not responsible for their actions, the other 2 per cent. being expert and intelligent criminals, avowed enemies of society. He thought the Medico-Legal Society might usefully discuss the problem of the 98 per cent., their measure of responsibility, and the best way of dealing with them. In responding, Sir John H. Parsons, president of the Royal Society of Medicine, said that a rather extreme conservatism characterized both professions. The law was always suspicious of change, while as for medicine there were no more conservative bodies in the country than the Royal Colleges. Mr. Justice Porter, who also replied, spoke of the habit of relevance in both professions. The lawyer's relevance was different from the doctor's. The doctor as a psychologist might talk to his patient about many things which had nothing to do with his disease, but all the time he was observing his patient and getting something out of what was apparently irrelevant matter. On the other hand, the lawyer constantly narrowed down his witness, saying, "Yes, but that has nothing to do with the point at issue." Even the law's jests had a certain relevance. The job of the lawyer was to see that good order was kept in the State, and if such order meant the sacrifice of the happiness or even of the life of the individual such sacrifice must be made. The doctor was more of an individualist, less occupied with the wider concerns of the State. A further difference between the two professions, added Mr. Justice Porter, was that medical men had no final standard of truth. In law there was such a final standard; it was "what the House of Lords says"! Air Vice-Marshal Sir Philip Game, Commissioner of Police, who proposed the toast of "The Medico-Legal Society," expressed the hope that the establishment of a police laboratory at Hendon and the larger project of a national medico-legal laboratory as part of the University of London would afford an opportunity for closer association between the medical profession and those concerned in the administration of the law. Mr. Ainsworth Mitchell, in response, spoke of the effectiveness of the work of the Society in many directions, and mentioned that it had gained one hundred new members during the year. Judge Earengey proposed the health of "The Guests," to which responses were made by Sir William Bragg, president of the Royal Society, and Sir Alexander Maxwell, Deputy Under-Secretary of State for the Home Office. The latter remarked that it had always astonished him, as one long connected with the Prison Commission, to see the way in which the prison doctor understood and appreciated the legal attitude of mind; but he thought it was of no use blinking the fact that a large proportion of general practitioners did not altogether sympathize with the outlook of the legal profession. The general practitioner with whom he was best acquainted recently had to give evidence in the county court concerning one of her patients, and on her return she said, "I was not allowed to tell the truth, but I think I resisted the efforts of the lawyers on both sides to make me tell a lie." In addition to those mentioned as having spoken, several other distinguished guests were present, among them Viscount Dawson of Penn.

Luncheon to Miss Olga Nethersole

A distinguished company representative of medicine, social welfare, and the theatre assembled at Claridge's on December 10th at a complimentary luncheon to Miss Olga Nethersole, the founder and honorary organizer of the People's League of Health, who was recently made a Commander of the Order of the British Empire. Lord Leverhulme presided. A letter was read from Lord Horder, expressing admiration for Miss Nethersole's pluck and pertinacity: "I have seen Miss Nethersole faced with difficulties before which most of us would have shrunk and accepted defeat, and with a quiet dominant assurance and steady confidence in the goodness of her case she has succeeded again and again. I take off my hat to her." Lady Simson (better known as Miss Lena Ashwell) gave some particulars of Miss Nethersole's stage career, in the course of which she had played many tragic parts with great success during twenty-seven years of professional life as actress and actress-manageress. Sir Thomas Oliver spoke of Miss Nethersole's genius for choosing the right people to help her. Sir Robert Armstrong-Jones referred to the fact that Miss Nethersole's organization had always worked with the constituted authorities in health matters, and never independently of them, and had never been political in character. Sir Frederick Hobday spoke of the debt which the veterinary profession owed to Miss Nethersole as a great lover of animals and also mentioned the campaign of the People's League of Health on behalf of clean milk. Dr. William Hunter spoke as representing the Royal College of Physicians, adding a few words of appreciation. Miss Nethersole said in response that she thought she must have been born under a lucky star, for she had seen many of the ideals for which she had striven over a number of years take legislative form. It had early appeared to her that the efforts of voluntary bodies working in the service of the people had been directed in great measure to the treatment of disease rather than to prevention. She had also been impressed by the slowness with which the Government and local authorities had applied medical and scientific discoveries affecting the health of the people. Her own interest in public health matters dated back to 1906, when, at a public meeting in Edinburgh, she urged that tuberculosis should be made notifiable. Having learned of the reduction in tuberculosis in Germany following upon the workers' insurance laws enacted there in 1882, the year after Koch's discovery, she addressed public meetings in a number of cities urging the establishment of workers' health insurance in this country; that was five years before Mr. Lloyd George, in 1911, introduced his scheme. The People's League of Health, which she organized in 1919, immediately after leaving the Army nursing service, worked under the expert guidance of medical, science, and veterinary councils; she herself was only a link in the chain. Her object in founding and carrying on the League had been to secure the practical application to the health of the people of the ever-accumulating medical

and scientific knowledge, and to hold, as it were, a watching brief for the plaintiff in the cause of "The People *versus* Preventable Diseases." Dr. C. O. Hawthorne, chairman of the League Council, proposed a vote of thanks to Lord Leverhulme for presiding. Among others who attended the luncheon were Professor Lyle Cummins, Mr. C. H. Fagge, Sir Ernest Graham-Little, Sir John Lynn Thomas, Sir John Moore, Dr. C. S. Myers, Dame Louise McIlroy, Sir Milsom Rees, Sir John Robertson, Sir Pendrill Varrier-Jones, and Professor James Young.

Scotland

Hospital Services in Lanarkshire

Proposals to extend the hospital services of Lanarkshire have been under discussion by representatives of Lanark County Council and of town councils in the area. The conference was held following a request by the county council to the Commissioner for Special Areas in Scotland for financial assistance towards the cost of extending hospital services. The Commissioner had made the consideration of giving assistance dependent upon the services being available for both county and burgh areas in Lanarkshire. The proposals include the provision of a general hospital at Motherwell with 550 beds on the site of the present Motherwell and Wishaw burgh hospital; a new infectious diseases hospital containing 550 beds; and a new maternity hospital of 150 beds, with provision for extension. It is estimated that the scheme will cost approximately £1,000,000, and if agreement can be reached between the various local authorities and the Department of Health in regard to co-ordination of the hospital services it is expected that a grant of 40 per cent. of the cost will be made by the Commissioner for Special Areas. The county council is favourable to the scheme, but difficulty is raised by some of the burghs, which consider that they have already made full hospital provision, especially for maternity cases. The Department of Health is of opinion that the provision made by the burghs does not meet the scope of modern maternity hospitals, while there is also some difficulty in obtaining joint action between the larger burghs and the county council.

Glasgow Hospital for Women

At the annual meeting of the Glasgow Hospital for Women Mr. Francis Beattie, who presided, gave some interesting figures which showed the increased demand for hospital treatment. In 1934 the voluntary hospitals of Great Britain, numbering about 1,000, had had an income of £15,000,000 and had treated 1,200,000 in-patients and 5,500,000 out-patients. They were gradually abandoning the policy of confining themselves to the treatment of the sick poor, and middle-class patients who could not afford the charges for nursing homes were accommodated in new wards where they could pay something towards their maintenance and the services of physicians and surgeons. Two years ago the Glasgow Hospital for Women had decided to introduce such a scheme for the admission of patients on a part-payment basis, and this had proved in all respects beneficial. Municipal hospitals had a certain advantage over voluntary hospitals in belonging to a unified administrative system, and deriving their funds from public finances, while their permanent staff relied upon fixed salaries. Their dependence on public funds, however, was a drawback in some respects—for example, it deterred them from experimenting in administration. The voluntary hospitals, on the contrary, enjoyed the advantage of being autonomous bodies free to experiment boldly within the limits of their funds on new methods of treatment and on pioneer research work. The speaker appealed for greater support for the Glasgow Hospital for Women, which was now effecting considerable re-equipment. Ordinary revenue for the past year had amounted to £1,857 and extraordinary revenue to £3,337.

India

Malaria in Ceylon

In his administration report of the medical and sanitary services of Ceylon for 1935 (published in October, 1936) Dr. S. T. Gunasekara reviews the progress of the malaria epidemic in the island since the issue of the special report in April, 1935. The Western Province had an unprecedented outbreak towards the end of November, 1934, and the epidemic continued with some severity until March, 1935. At the end of the following month there was a marked recrudescence, which did not abate until the end of June. In the Central Province there was an increased attendance for malaria treatment in certain areas, and drought caused a rise in the incidence figures for dysentery and typhoid. In the Southern Province the malaria outbreak continued throughout the year, but with less intensity than in other parts of the island. In the North-Western Province the epidemic started towards the end of 1934, and was particularly severe during the following January and February, but began to subside at the beginning of March. In the middle of April there was a second wave of less intensity. In the North Central Province the number of cases treated was the highest ever recorded, reaching its maximum during the months of January and December. The hospital admissions for malaria in 1935 were 161,313 cases, as compared with 41,551 in the previous year, and the number of cases treated at the dispensaries and out-patient departments of hospitals was 5,293,468, as compared with 2,293,224. The death rate rose from 2.4 per cent. in 1934 to 3.3 per cent. in the year under review; the proportion of the malignant type was higher than usual, many deaths being due to cerebral malaria and convulsions in children. Special arrangements had to be made to supply medical aid in the epidemic areas. Details are given in the report of the work of treatment and prevention in the several districts. As compared with the previous year there was an increase in the cost of oiling larval breeding places, the number of rainy days being higher in 1935, and more possible breeding places having been created. In some districts almost all the wells were found to be full of larval anophelines, and required intensive petrolization and the introduction of fish. Paris-green dusting was tried in the case of some ponds, with only fairly satisfactory results. Periodical spleen examinations of school children revealed improvement in some districts, following treatment on a large scale with quinine. The efficiency of the fish treatment of breeding places was found to be very high, and in many cases wells could be used as subsidiary nurseries for stocking other suspected deposits of water. Maintenance work was conducted on a large scale, rivers being cleaned, drainage systems established, and pits and hollows in the ground being filled up. Quinine seemed to be as good a prophylactic as quinoplasmoquine, and cheaper.

Epidemic Diseases in Rangoon

The city of Rangoon was afflicted with three epidemics in 1935; small-pox and cholera prevailed in the first quarter of the year, and epidemic dropsy in the rainy season. In the first two of these intensive inoculation and vaccination proved strikingly effective. In the third epidemic there were 610 cases of beri-beri and epidemic dropsy with eighty-one deaths, as compared with 151 cases and eighty-three deaths in the previous year. During the month of July the incidence curve of epidemic dropsy began to rise, the peak was reached in August, and decline set in in September. The annual report on the health administration of Rangoon for that year gives an account of conclusions drawn from intensive investigations. The explosive nature of the outbreak suggested that the disease was brought about suddenly by some toxin, and did not result from any deficiency of diet; in a large number of cases there was no question about the adequacy of supply of the known vitamins. The Bengalis were particularly susceptible, constituting 72 per

cent. of the cases, irrespective of whether they lived in Calcutta, Benares, the United Provinces, or Bihar. Epidemic dropsy seemed to be more widely prevalent in the large towns situated on the deltas of the big rivers, and the consumption of rice appeared to be a factor in its incidence, though no clear evidence was forthcoming whether it and mustard oil exerted any predisposing influence. The Bengali community of Rangoon was advised by means of advertisement in the local press and special handbills to exclude rice from its dietary as much as possible ; a considerable number of persons acquiesced, with the result that the condition of sufferers improved and further spread was checked. The disease was associated with the consumption of both locally milled rice and the parboiled rice of Calcutta. There was no evidence to suggest that the epidemic was of the nature of an infection lurking in a house or any particular locality. The occurrence of cases in whole families or in localities where Bengalis predominated was explained by the peculiarity of their diet or racial predisposition ; members of other communities who were immediate neighbours and whose dietary was different invariably escaped. Most of the patients were engaged in sedentary occupations and belonged to the middle classes ; the condition of their general metabolism was admittedly unsatisfactory, and the prevalence of the heavy rains deprived them of exercise in the open air. The consumption of infected or deteriorated rice owing to storage under moist and hot conditions of the wet weather could not be assumed to be the only factor concerned, since such rice was freely consumed by members of the other communities without any harmful effects. Bengali Hindus were nearly as much affected as the Bengali Mohammedans, and it is suggested that it would be well to inquire whether this proclivity might be associated with an excess of carbohydrates in the diet and a proportionate decrease in the proteins. The most frequent age of the patients was between 20 and 40. Males were far more often affected than females, the proportion being 54 to 7. The death rate on the whole was low (0.2 per mille). Deaths from tuberculosis increased in 1935, and there is still lamentable public apathy in this respect, but declines were noted in the death rates of diarrhoea and dysentery, plague, typhus fever, measles, and chicken-pox.

Dental Progress in Sind

Opening the new premises of the Laxmibai Patel Dental Hospital and College of Dentistry in Karachi last July, Sir Lancelot Graham, Governor of Sind, emphasized the importance of correlating dental work and medical practice in India and of paying more attention to the teeth of school children, 50 per cent. of whom had been found on inspection to have defective teeth. Dr. M. K. Patel, principal of the college, pointed out the unhappy consequences resulting from the fact that there was in India no control of the practice of dentistry, anyone being free to practise without having a licence or other evidence of adequate training. The college in Karachi had been opened in 1926 ; other colleges existed in Calcutta and Bombay, and medical graduates could be trained in dentistry at the Government College in Lahore, but this was a totally insufficient provision for the needs of the community. The Karachi College covered a floor space of over 6,000 square feet, and its four floors accommodated lecture halls, laboratories, a library, and a museum. The associated hospital had twenty-one dental chairs, and in 1935 more than 1,000 children from the schools had been examined in addition to the routine treatment work. There was as yet no compulsory examination of children's teeth, and much disease remained unrecognized until serious consequences had resulted. The institution was maintained on a voluntary basis, and there was still very little financial support from the public. The training in the college occupied two years, but should be longer, and there was as yet no State test of efficiency. The importance of dental care needed to be brought home to the population, and recognition by the Government and universities of dental tuition would follow in due course. The *Indian Dental Review* was now in its tenth year of publication, and through it efforts were being made to awaken public opinion and the interest of education authorities. Previously students had been obliged to go abroad for proper dental training, but many were now coming to Sind from such far-distant parts as Mysore, Bengal, Baluchistan, Madras, and the United Provinces.

CORRESPONDENCE

Medical and Dental Inspections of School Children

SIR,—The " misapprehension " to which Sir Frederick Menzies refers was occasioned by Mrs. Lowe's statement. Writing to the *Times* in her official capacity as Chairman of the Education Committee of the London County Council, she said that by the current regulations, enforced by the present political majority of the L.C.C., medical inspections of the school child had been reduced from four to two and dental inspections increased from six to eight. Mrs. Lowe regarded that change as an improvement on the previous practice ; triumphantly recorded it as a score over her political opponents ; and, as I understood her letter, cheerfully envisaged the complete disappearance of medical inspections " next year."

It is unfortunate that Mrs. Lowe did not consult her medical colleagues before rushing into print on a subject in which she was so obviously misinformed ; and I, in common, I believe, with the whole medical profession, welcome Sir Frederick's authoritative correction of her inaccuracies, a correction which might profitably be made also in the *Times*, in which the original statement was published, and, I believe, has met with no contradiction. But I am afraid I remain an impenitent critic of the arrangements described by Sir Frederick, even while admitting that they are somewhat better than appeared from Mrs. Lowe's account. I would ask Sir Frederick if he is really satisfied that three, or at most four, medical inspections, as against ten dental inspections, represent the best allocation that can be made of the school services devised to protect the health of the child throughout school life.—I am, etc.,

House of Commons, Dec. 12th. E. GRAHAM-LITTLE.

Consistency of University Examinations

SIR,—Conciseness (as all editors know) is so rare a virtue that it is ungracious to complain that Dr. Gilbert Millar has been a little too concise in his paper published on December 12th. But I am not sure that a majority of your readers are sufficiently familiar with *An Examination of Examinations* to be able to appraise the relation to it of Dr. Millar's useful analysis.

As I see the matter the first six of Dr. Millar's tables do not either diminish or increase the disquiet Hartog and Rhodes produced. They are useful illustrations drawn from another field of the intercorrelations of markings in different subjects ; the order of magnitude of the correlations is not different from what has been observed in similar studies of non-medical examinations—for example, such values as those quoted by Spearman (*Amer. Journ. Psych.*, 1904, xv, 275). They provide more material for what has been called factor analysis—that is, for determining how far (1) some general factor, (2) group factors, (3) specific factors determine performance in a particular test. Of course this is a much more important matter when the purpose of the examination is to pick out ability *sans phrase* than when acquirement (or lack of acquirement) is as important. In a professional examination qualifying for a legal status " mere " acquirement is

important. An ancient tale of the College of Surgeons is relevant. An examiner is reported to have said: "If, in such and such circumstances, I ask a candidate what he would do, and he answers 'I don't know,' well, I feel that if he did have such a case he would probably send for me and I pass him. But if he says, 'I should do so and so,' I plough him, because he might do it, and the lives of the Queen's subjects must be protected."

What was disquieting in Hartog and Rhodes's results was this. That when the same batch of candidates were re-examined in the same subject by different examiners—or even by the same examiners—the correlation of markings, although usually substantial, was very far short of unity, and a quite appreciable number of candidates were placed by the two tests in seriously different categories. Dr. Millar's tables VIII and IX do throw light upon this point. I do *not* agree with him that Table VII standing alone tells us all we need. Unless a correlation coefficient is very close to unity we do need the distribution from which it was calculated. It seems to me that the results are sufficient to make it very improbable that either a sensible number of candidates whom the internal examiners would plough would be passed by the external examiners or conversely. That is very satisfactory. But if the examination were a competitive one, even here there is room for disquiet. Suppose the best candidate is to receive a prize. The "combined" results of Table VIII would divide it between the two candidates who earned 70–75 marks. The "final" results would give it undivided to an individual who was beaten by four others in the "combined" test.—I am, etc.,

Loughton, Dec. 14th. MAJOR GREENWOOD.

Blood Transfusion Fatalities

SIR,—Though occurring mainly in medical cases, the incidence of six fatalities following blood transfusion is alarming, even to those using the procedure on surgical material. In the latter case it is but an accessory to the operation, and if not always as efficacious as we believe, at least is regarded as a harmless tonic. It comes as a shock to learn of a lethal issue in a number of cases in a relatively short period, and cannot fail to arouse the concern of us all. I hope we are justified in asking for further information from Dr. Plummer, who has already put us much in his debt by such a valuable report.

1. Is the surgeon to infer that the secondary anaemias of chronic peptic ulcer or malignant disease of the alimentary tract are henceforth to be "suspect"? Certainly I think my experience of them as recipients would not have led to any misgivings.

2. Is it rightly assumed that the citrated blood was in each case (*a*) freshly drawn, and (*b*) conveyed by the simple tube and funnel technique?—I am, etc.,

Bristol, Dec. 13th. A. WILFRID ADAMS.

Snake Venom for Haematemesis

SIR,—The interesting account by Dr. A. Barratt in the *Journal* of November 28th (p. 1083) describing his successful use of snake venom in haematemesis raises the question of the maximum dose of the venom which might be employed in such cases per os.

It is safe to say that Russell's Viper venom could safely be given in larger quantities than that represented by a single phial of stypven. A 5 c.cm. phial of stypven contains 0.5 mg. of Russell's Viper venom, and Acton and Knowles (postulating a susceptibility in man equal to that of monkeys) estimated the smallest fatal dose for man at 42 mg. Further, since snake venoms lose their toxicity before they are absorbed by the intestinal mucous membrane, only that proportion of the dose that comes in contact with the broken surface need be considered.

We would suggest 5 c.cm. or 10 c.cm. of stypven or its equivalent, repeated if necessary, as a dose more certain to carry the coagulating enzyme to the bleeding surface. Since one would expect it to lose its activity fairly rapidly in the stomach we think it would be reasonable to repeat the dose if the ulcer continued to bleed after half an hour.—We are, etc.,

BURGESS BARNETT, M.R.C.S.
London, W.1, Dec. 14th. R. G. MACFARLANE, M.B.

Bromide Intoxication

SIR,—It is evident that the problem of the toxicity of the bromides needs further elucidation before it can be placed in its proper perspective. The cases described by Drs. Barbour, Pilkington, and Sargant in the article on "Bromide Intoxication" in the *Journal* of November 14th (p. 957) were very impressive. But is it not probable, having regard to the immense frequency with which the bromides are prescribed, that the long arm of coincidence was accountable for bringing the cases together in the short space of five months? The authors remark that skin lesions are comparatively rare as signs of bromide toxicity. Recently four hospital cases under treatment for neuroses appeared out of a total of about twelve in one afternoon, with acneiform eruptions due to bromide. They were all taking the hospital pharmacopoeia mixture containing the small dose of 12 grains of pot. brom. t.i.d. Three of the patients had been taking the drug for two weeks and one for nearly three.

A question of pharmacological fact arises concerning the extent to which the bromides can replace the chlorides in the body. Micks states (*Essentials of Materia Medica*, 1935, p. 123) that not more than one-third of the chlorine of the tissues can be replaced by bromine, whereas the writers of the article on bromide intoxication give the amount of blood bromide present in the fatal case recorded as being equivalent to a 47 per cent. replacement of sodium chloride.

The factor of idiosyncrasy has, as the writers of the article point out, to be taken into account. It is of course advisable to bear this particularly in mind in prescribing all classes of sedatives, though in my experience it shows itself much more frequently as resistance to the action of the drug than as undue susceptibility. Apart from this factor, however, there is evidence which indicates that it may be the smaller doses of bromide which produce the most dangerous toxic symptoms, and that at least in certain types of cases very large doses are not only safe if administered with reasonable care but beneficial. Dr. Wm. W. Wright has described (*Amer. Journ. Psychiatry*, vol. v, p. 365) a series of eighty-five psychotic cases treated by large doses of bromide. The amounts given were not tabulated for all the patients, but doses of 100, 200, or 300 grains and over were given daily and continued, at least in some of the cases, over periods of weeks or months. No fatalities were recorded; four cases recovered, 50 per cent. showed a decided improvement, and 75 per cent. benefited to some extent. The author states:

"With the smaller doses there is almost invariably produced a toxic state, loss of weight, skin rashes, etc. With the larger doses, with the exception of a transient erythema, rashes are rather infrequent. Again, while the smaller doses seem to dull the intellect the larger doses not infrequently produce a more active mental state."

—I am, etc.,

London, W.1, Dec. 8th. FREDERICK DILLON.

SIR,—In reply to "B. P.," writing in your issue of December 12th, I think he is quite right in having faith in the bromides as most valuable remedies in a very large number of affections of, or connected with, the nervous system. A drug is seldom very valuable unless it is "dangerous." We need, however, to consider in what respect it is dangerous. The bromides are for the most part very harmless, and can quite safely be given in large or small doses over a considerable period. They are definitely dangerous if taken daily in ordinary doses over a long period—a danger which probably varies with different individuals.

From my own experience I may mention the case of a neurotic patient who derived great benefit from bromides, with the result that I continued the treatment without noticing how long I had been giving it. She developed a nasty carbuncle in the gluteal region, which I had no doubt was due to cumulative effect from the drug. I then, of course, stopped it, with good results.

In another case a man who had been a patient of mine went away to another district and had another medical attendant. He became very ill, and asked me to see him. I found him in an extremely bad condition, and came to the conclusion that his nervous condition (on the verge of insanity) was due to the taking of a very full dose of bromides over a very long time. I contented myself with recommending a change of medicine, with which his doctor agreed. A short time afterwards I was told that he had recovered wonderfully, and strong criticism was made of the previous treatment, with which I quite agreed, though not saying so.

On the other hand, drugs such as morphine and alcohol, etc., which are legally styled "dangerous," do not appear to be so in moderate doses, even over periods of twenty or thirty years. As an instance I may mention the case of an old lady who continued taking a prescription containing a full dose of laudanum for twenty or thirty years. She had had very good health throughout. Unfortunately she had accumulated a stock of medicine bottles, and had used them for various purposes. She had medicine in one bottle, whisky in another, and ammonia solution for cleaning clothes in a third. One dark day she took ammonia instead of whisky, and died as a result. She was about 95 when she died, and without saying that the laudanum had lengthened her life I feel sure that neither the laudanum nor the whisky had done her any harm.

There has not been at all sufficient investigation of the effect of apparently harmless drugs taken constantly over very long periods.—I am, etc.,

Lingfield, Surrey, Dec. 12th. HUGH WOODS, M.D.

Hebaral Sodium Poisoning

SIR,—I read with much interest an account of a case of hebaral sodium poisoning in the *Journal* of December 12th (p. 1196). With regard to the treatment outlined in this case I note that the patient was admitted to hospital at 9.30 p.m., and that lumbar puncture was performed at 1 a.m. the following day. In the *British Medical Journal* (February 24th, 1934, p. 327) I published a short article, "A Warning Regarding Basal Narcotics," and emphasized that two of the essential points in treatment were repeated lumbar punctures and massive doses of strychnine. In one case which I quoted 1/3 grain of nembutal was found by Dr. Roche Lynch in 12 c.cm. of cerebro-spinal fluid. The value of repeated withdrawal of cerebro-spinal fluid is that the fluid withdrawn is replaced by fresh fluid of lower narcotic content. Thus not only is the poison withdrawn but the brain is bathed in less toxic fluid.

My object in writing this is to emphasize the important point that, in cases of poisoning from barbiturates, the sooner lumbar puncture is performed the better; in the case described in your last issue a delay of four and a half hours elapsed. Barbiturates are still in common use, and as some patients evince an idiosyncrasy to them it should be recognized by those responsible for their administration that the *immediate* treatment of apparent poisoning is lumbar puncture, repeated if necessary, combined with massive doses of strychnine.—I am, etc.,

London, W.1, Dec. 11th. R. J. MCNEILL LOVE.

Mechanics of Glaucoma

SIR,—There appear to be two contradictory contentions regarding glaucoma established, which must be my apology for addressing you so soon again on this subject. As is usual in such cases, an omitted factor furnishes the key to correlation. The argument that as the intake of the anterior chamber is so much greater than the outlet the shallow chamber cannot be due to loss of fluid is apparently sound. On the other hand, there is abundant evidence, accumulated since Priestley Smith's early work was published, that acute glaucoma is associated with cyclitis. Swelling of the ciliary body cannot take place without displacing something from the eye, and that something can only be aqueous humour. We thus reach an impasse.

The first contention is true only if the secretion of aqueous humour is normal or increased. If there be lessened secretion with increased outflow due to hypertension the content of the anterior chamber will be depleted. The assumption of lessened secretion of the aqueous humour is not purely theoretical. During the acute stage of inflammation the amount of fluid passing out of a focus, whether free or confined in cells, is not sufficient to lessen the pressure in it, and under similar conditions there can be very little fluid passing from the ciliary body. In addition, Niesnamoff's beautifully systematic work shows that as tension rises the secretion of aqueous humour is lessened progressively till at a pressure of about 48 mm. of mercury it ceases.

The time-table of acute glaucoma, then, is cyclitis, causing hypertension, decreased secretion of aqueous humour, and increased outflow of it; later on lessened flow through the canal of Schlemm owing to the tissue over it becoming less pervious from pressure and to the viscosity of inflammatory fluid containing both colloid and debris; lastly, blocking of the canal from the advance of the iris.

It seems to be fairly evident that glaucoma is not due to a blocked canal, and we are no longer faced with the contradiction of this condition in conjunction with a shallow chamber.—I am, etc.,

Montreal, Nov. 26th. RICHARD KERRY.

A National Industrial Health Service

SIR,—In the leading article on industrial medicine in the *Journal* of December 5th you raised hopes of a national industrial health service being established. May I stress the importance and urgency of this problem by referring to the industrial eye injuries. The medical profession at large is unaware of the tremendous number of industrial eye injuries occurring in London.

The Royal Eye Hospital, London, attends in the out-patient department to approximately 6,500 industrial eye injuries every year. The industrial cases represent over 10 per cent. of all the in-patients of the hospital. A number of eyes are excised every year following perforating eye injuries and intra-ocular foreign bodies. Many individual workmen have had as many as twenty-four corneal foreign bodies removed during the course of the past four

or five years. Many patients are left with corneal scarring which has reduced their vision to 6/24 or 6/18. Most of these injuries could have been prevented by the use of various safety measures.

A national industrial health service is most essential for the co-ordination of the vast work necessary for the prevention of industrial injuries. Hospitals situated in industrial areas could act as centres in the organization of preventive work and could be brought into close contact with factory safety committees and medical inspectors of factories. The investigation of all serious eye injuries might be carried out jointly by the safety committees of the hospital and the factory. Results from neglecting the use of preventive measures could be demonstrated to the workmen by means of propaganda centres organized at the hospital. A national industrial health service should soon achieve a diminution of eye injuries and with it of its resultant total or partial blindness.—I am, etc.,

JOSEPH MINTON, F.R.C.S.

The Royal Eye Hospital, S.E.1, Dec. 5th.

Physical Medicine

SIR,—In the *Journal* of December 5th, under the title of "The British Health Resorts Association," Dr. Alfred Cox is reported as stating that the Medical Advisory Committee had prepared a curriculum which it was hoped might eventually be used for the training of practitioners who wished to specialize at the health resorts. Perhaps a better plan would be for this committee to press for a chair of physical medicine at all teaching centres. This subject has now reached a position of importance in the medical curriculum rivalling subjects such as public health or forensic medicine. Physical medicine, as defined by the British Medical Association, is now a big subject, vide the programme at the Oxford and other Annual Meetings. Hydrology and climatology are included in this Section.—I am, etc.,

Bath, Dec. 7th. A. GORDON WATSON.

Insertion of Smith-Petersen Nail

SIR,—I would like both to thank Mr. W. Gissane for his letter to the *Journal* (December 12th, p. 1229) and to answer it.

My own technique coincides exactly with that described by him, and in no case have I completed the operation without satisfying myself that the nail has been "in" right up to its head. I cannot agree with his explanation of the cause of the nail becoming extruded during impaction of the fracture. This phenomenon, familiar no doubt to all operators, is due chiefly to the inertia of the nail itself, resulting in its being "left behind" during the slight but very rapid movements transmitted to the femoral neck and pelvis by the heavy impacting blows. The extrusion itself shows that the nail is not gripped securely in its longitudinal direction. Brittain's "snagged edge" nail and Watson Jones's "nail-cap," both designed to prevent extrusion, lead one to believe that accidental extrusion is an inherent weakness in the principle of osteosynthesis by the plain stainless steel nail, and is of not infrequent occurrence. In the first of my two cases the report on *x*-rays taken *several days after operation* stated that the "position of nail appears perfect in both antero-posterior and lateral views." Pain was complained of ten weeks later, and *x*-rays then showed that the nail had been extruded. In the second case a skiagram taken exactly six months after operation showed the nail to have remained in its correct position. Three months later the patient was being rather too enthusiastically helped into a car and badly wrenched her leg. This accident resulted in a re-fracture with recurrence of displacement, union evidently being insufficiently strong to withstand the strain *without the aid of the nail in situ*. *X*-rays demonstrated that the nail had become extruded at some time between six or nine months after insertion.

Following these two failures it is satisfactory to know that by a simple modification, adding less than three minutes to the operation time, such a misadventure cannot occur again.—I am, etc.,

Winchester, Dec. 14th. B. H. PIDCOCK, M.B., F.R.C.S.

Cod-liver Oil in External Eye Affections

SIR,—In your issues of October 3rd and 10th references are made to this subject which make it appear a clinical novelty to use cod-liver oil as eye drops. Deficiency diseases are common in Brunei, and it has been a routine practice in the Brunei Hospital for years that such cases with eye complications should have thrice daily instillations of cod-liver oil drops into the eyes. I cannot remember what made me start such treatments, but it never occurred to me before reading the references in the *Journal* that applying cod-liver oil to the eyes was anything unusual. The results are uniformly good, but I regret I cannot give figures or a comparative series of cases because, as I say, I have until now considered it nothing to write home about.—I am, etc.,

Brunei, Borneo, Nov. 23rd. W. G. EVANS.

The Earliest Sanatoria in England

SIR,—Recent correspondence on this matter has prompted me to add further notes to the history of sanatorium treatment in England, and to bring forward the claims of another institution as the earliest of its kind in this country—namely, the Western Hospital, Torquay. I have before me a circular issued in 1850 and entitled, "Wiltshire Institution for Patients of a Consumptive Tendency, Natives of, or Resident in the County of Wilts." This gives the reasons for establishing an institution in Torquay and shows clearly that the founders had the sanatorium regime as we know it in mind. A quotation is of interest:

"The Climate of Wiltshire appears to be peculiarly unfavourable to all diseases of the chest. Early exposure to inclement weather in field work seems to develop the least consumptive tendency, and our severe winters afford little chance of recovery to the invalid. It has long appeared desirable to establish an Asylum in some mild climate to which patients of the poorest classes may be sent at an early stage of the disease *to escape the winter, where they may breathe a favourable air and receive wholesome nourishment.* It is in contemplation to take a house near Torquay capable of receiving twelve patients . . ."

The annual report for 1852 draws attention to the change of name to Western Institution and further emphasizes the objects.

"Of the prevalence of the disease of the Lungs and Chest in this Country none can doubt, and as the opening of Railroads has rendered it easy and inexpensive to convey invalids to our South-Western Coast, it has become an imperative duty to secure to the poor those *advantages of climate, food, and medical treatment,* which can alone check the progress of that fearful scourge, and which have hitherto been attainable to the Rich alone."

And again in the annual report for 1856 it is found that the name has been changed to "Western Hospital for Curable Consumptive Patients." An extract says: "It is needless to point out how essential must ever be a *sufficiency of fresh air* to the class of invalids whom it is our happiness to benefit," and at that time a move was made to other premises so that the garden could be utilized for the treatment of patients in the fresh air.

These few details should suffice to show that the Western Hospital, Torquay, has some claim to the honour of being

one of the first (if not *the* first) institutions in this country to carry out the principles of sanatorium treatment—namely, rest, extra feeding, and fresh air. It continued its work until 1914, when the buildings were taken over as a war hospital. The local committee of management still exists, as does its honorary medical staff (consisting of two physicians, one surgeon, and a laryngologist), but its patients are received and treated for the time being in another well-known institution. The buildings referred to in the report for 1856 are still used (by the Devon County Council) as a hospital for tuberculous patients.

It will be noted that long before Torquay had gained popularity as a winter resort amongst the Royalty and the "gentry" it was recognized as the most suitable place for persons with "weak chest" to spend the winter. A considerable part of the prosperity of Torquay has depended upon the fact that it has always been regarded as eminently suitable for persons suffering from pulmonary tuberculosis and other chest complaints. An interesting fact, though irrelevant to the matter of this letter, is that the first honorary secretary of the Western Institution was Dr. C. Redcliffe Hall, who in 1860 became President of the British Medical Association.—I am, etc.,

Torquay, Dec. 5th. RAYMOND H. ROBINSON.

SIR,—Dr. D. A. Hutcheson (*Journal*, December 5th, p. 1171) has introduced a fresh issue in this correspondence. It is well known that the Royal National Sanatorium at Bournemouth was opened in 1855; the Brompton Chest Hospital was opened still earlier, in 1841; and the Victoria Park Chest Hospital in 1848. While the Bournemouth site was infinitely better than that of these two London institutions, the methods of treatment at that period were much the same in all. Sanatorium treatment on modern lines (minus its surgery), by continuous fresh air, abundant well-chosen food, graduated rest, and exercise, was introduced much later and was at first believed to be possible only in mountainous, later on in other country, districts. The outstanding merit in this respect of Dr. Burton-Fanning, Dr. Jane Walker, and other pioneers was that they proved the usefulness of true sanatorium treatment in England.

The earliest London chest hospital to adopt continuous fresh air was probably the Mount Vernon Hospital for Consumption, which had a far better position for the purpose than the other chest hospitals.—I am, etc.,

Farnham, Dec. 7th. F. R. WALTERS.

Medical Notes in Parliament

[FROM OUR PARLIAMENTARY CORRESPONDENT]

In the House of Lords on December 11th the Royal Assent was given to the Declaration of Abdication Act. At subsequent sittings both Houses took the Oath of Allegiance to King George VI, a message from whom was delivered to Parliament on December 14th. Addresses in reply were carried.

In the House of Lords on December 8th the Geneva Convention Bill has passed through committee.

The House of Lords read the Geneva Convention Bill a third time on December 11th and sent it to the Commons. On the same day the Lords gave a second reading to the Expiring Laws Continuance Bill. The Trunk Roads Bill passed through committee in the Lords on December 14th.

The Parliamentary Medical Committee heard an address from Miss Gertrude Tuckwell on December 11th about factory and workshops legislation.

In the House of Lords on December 15th the Public Order Bill and the Expiring Laws Continuance Bill passed through Committee.

On December 15th, at the House of Commons, Mr. Geoffrey Peto, chairman of the Food Council, described to the Conservative Party Nutrition Committee the work of that council.

Hygiene of Offices

The second reading of the Offices Regulation Bill was moved in the House of Commons on December 4th by Mr. AMMON. He said that a similar Bill had been introduced every year for the past twenty-five years, and in a debate a short time ago Sir Francis Fremantle had spoken of its being brought in at least once in each of the sixteen years he had been in the House. By the luck of the ballot the measure had now become a twice-yearly Bill. The Bill he now presented was similar in all respects to the one brought before the House in March last. That it was brought in again indicated that suggestions made by Mr. Geoffrey Lloyd in March last did not fill the gap which required to be filled in legislation. The House had been told in March that the Public Health Act then under consideration would meet the needs which were declared in the Bill. That Act had no relation to London or to Scotland. It contained a useful definition of work places which was drawn to include offices and it also gave local authorities a right of entry, but not in London, where office accommodation was a greater problem than elsewhere. Section 208 of the Consolidation Act was likely to be a dead letter, because there were only 404 full-time sanitary inspectors in London, including the City of London itself, and these had to serve some five million people. It was no use relying upon the workers in offices to make complaints because, as Sir Francis Fremantle had said during the last debate, they dared not do so for fear of victimization. The need for legislation was clear when one noted that there were 4,250,000 persons concerned. The case for the Bill was mainly on health grounds. Mr. Ammon recalled how the fight which he and others had waged against the bad accommodation for workers in the Post Office had gradually stamped out tuberculosis from the Post Office service, where previously the mortality from it had been very high, although the workers were selected lives. He explained that the Bill was drawn on the lines of the Shops Act, 1934, and he read letters complaining of the unhealthy conditions for women workers in certain London offices.

NECESSITY FOR LEGISLATION

Mr. RAIKES moved the rejection of the Bill and Mr. WAKEFIELD seconded this amendment. Mr. CREECH JONES quoted from the annual report of Dr. Cyril Banks, medical officer of health for Nottingham, who spoke of the existence of slum offices and said that power to insist upon reform of places where clerks worked was long overdue. Dr. Banks would like to see an extension of the Shops Act. That medical officer was fully aware of his powers under existing legislation respecting public health, including the General Powers Act of 1936.

After further debate Sir FRANCIS FREMANTLE said he had been active in insisting upon similar provision for the last fourteen years. Some medical officers of health had in past years assumed they had power to inspect offices, and others doubted the possession of such powers or gave good reasons for not making the inspection. The Ministry of Health had hoped there would be a test case, and the Royal Sanitary Institute was of the same opinion as they were ten years ago, that some provision for the inspection of offices was necessary. The Institute also held that the present Bill was unnecessarily onerous. The Parliamentary Committee of the Royal Sanitary Institute had overlooked the fact that the provisions they desired were almost word for word incorporated in the Public Health Consolidation Act which had been passed last July. It therefore seemed to him that the present Bill was probably redundant except in so far as concerned London, where, although a Consolidation Act would probably provide corresponding powers, it might be advisable to go on with the present measure. As, unfortunately, Dr. W. M. Willoughby,

who had been medical officer of health for the City of London, had died this autumn, a vacancy existed in that post, and Sir Francis Fremantle had not been able to secure an opinion from the City, but another medical officer of health who had been particularly concerned with the question of office accommodation told Sir Francis that he concurred that some of the conditions in the Bill were unnecessarily onerous. One of these was with regard to underground basement offices. It was quite true that medical officers of health had not received many complaints, but the reason was obvious, as the clerk or typist did not feel able to make a complaint.

POWERS OF MEDICAL OFFICERS

Dr. H. G. WILLIAMS remarked that since 1875 the statutory duty of medical officers of health was not to wait for complaints but to inspect their districts. Sir FRANCIS FREMANTLE said he had already dealt with that point. There had been a division of opinion, and out of twenty-eight medical officers who had been consulted in 1925 only eight felt that they had power to inspect without complaint. Although many statements made with regard to ill-health in offices were due to the fact that the statistics dealt with persons who were not all equally healthy in the beginning, there was still a need for the Bill, and he would support it that afternoon.

GOVERNMENT REPLY

Mr. GEOFFREY LLOYD said Sir Francis Fremantle had made a useful contribution to the discussion. The Government was surprised that the Bill should be introduced so soon after it had been rejected. That rejection was largely due to assurances he had given on behalf of the Government that the Public Health Bill, then in draft, would meet a large number of the points raised in the Bill. The undertakings he had given had been fulfilled. The Public Health Bill had become the Public Health Act, and the House would not desire to apply new restrictions unless sure these restrictions would be required for purposes not already covered by existing legislation. Mr. Ammon had given the impression that the mortality figures in regard of office workers were such as to make out a strong case for new provisions. Civil Service statistics showed the mortality rate for male clerks who were Civil Servants was 15 per cent. below the male average up to 45 years of age, and the advantage became progressively greater thereafter. This was caused by a high physical standard at recruitment. The mortality rate for male clerks outside the Civil Service between the ages of 25 and 45 was about the same as for males as a whole. Thereafter they exhibited a mortality about 5 per cent. higher. The question of phthisis was important in both groups. In the Civil Service the excess mortality of phthisis was confined to the age group from 35 to 55 and seemed explicable by the admission of unfit or invalided ex-Servicemen after the war. The mortality from phthisis in clerks outside the Civil Service showed a slight excess, accounted for by the tendency of persons in a phthisical condition to find a living in clerical positions. It was also true that clerks had a relatively high mortality rate from angina pectoris and digestive diseases, which was offset by a low mortality from bronchitis and pneumonia. The mortality rates of single women engaged in clerical occupations compared favourably with those of other single women of the same ages, being in most cases above the average level. This showed that a factor of prime importance was the physical condition of the entrants, and that with women who had spent all their working lives in offices there was no indication that the mortality rates were unfavourably affected by their having worked in offices.

Mr. ALFRED SHORT replied for the Opposition, and the Bill was rejected on Second Reading by 169 to 114.

Medical Officers of Health and Private Practice

In the House of Lords on December 8th Lord MERTHYR asked the Government how many county councils in England and Wales had failed to formulate arrangements for securing that medical officers of health should not engage in private practice as medical practitioners, in accordance with the provisions of Section 58 of the Local Government Act, 1929, and of section 111 of the Local Government Act, 1933; and what steps were proposed to be taken for ensuring the observance of the law by such councils. He also moved for papers.

He said that medical officers of health would be the first to admit that they were not supermen and that they could not serve at one and the same time two masters whose interests frequently conflicted. If the interests of a medical officer's private patients conflicted with the interests of his medical authority it was only natural that the interests of his patients would be placed first and that of the authority last. Specialists were required in local government nowadays as in other walks of life, and it should be necessary for a medical officer to know only the barest details of surgery, while, on the other hand, he ought to be steeped in the law of public health.

Viscount GAGE said that twenty-seven county councils in England and Wales had so far failed to complete the formulation of such schemes, but it would be a mistake to deduce from those figures that there had been a serious breakdown of the administrative machinery. The principal cause of the delay was that certain counties had not completed the reviews of the county areas initiated in 1929. Relations between the Ministry and the local authorities had got to be maintained with discretion. The Minister of Health fully appreciated the importance of compliance with the requirements of the section of the Act as early as possible, and as soon as the reviews had been completed he would draw the attention of the county councils to their statutory obligation. Despite appearances to the contrary, the Minister of Health was satisfied that the majority of the twenty-seven county councils which had not yet formulated their schemes were taking steps to do so, and in the case of only three councils did it appear that failure had arisen, and he would use his powers in regard to those which continued in an attitude of non-compliance. The county councils remained responsible for making these arrangements, even though they might not have come to an agreement with other authorities within their area. But of course it was desirable that such agreements should be reached as soon as possible; the formulation of a scheme did not mean that no part of that scheme could be afterwards changed.

It had been argued that the appointment of a whole-time medical officer to cover a district at present served by several part-time officers must be delayed until all the part-time officers had finished their contractual periods of engagement. To overcome the difficulty provision was included in regulations issued by the Minister of Health last year to limit the appointment of medical officers who were not restricting their practice to a period of not more than a year at a time, and a similar limitation of period of appointment had been imposed by administrative action in such cases. It was hoped by this way to facilitate the appointment of medical officers of health restricted from private practice. The programme would be rather slow, but it was going steadily on. It never was contemplated that the reform should be carried out in a short time provided that progress was steady.

Lord Merthyr withdrew his motion for papers.

Medical Examination of Recruits

During a discussion on a motion concerning recruiting for the Defence Forces, moved in the House of Commons on December 9th by Mr. PALMER, Sir ARNOLD WILSON said that at present men could not be medically examined at Army recruiting offices after 3 or 4 o'clock. There should be combined recruiting offices for all three services with a medical staff in each. The present medical tests should be reconsidered. There ought not to be a uniform standard for each unit. A special standard would suffice for men employed as cooks and on menial duties. Most men rejected during the past year had been rejected for bad teeth. Even in the field soldiers did not get "hard tack" except on rare occasions, and the requirement about teeth was out of date.

Mr. DUFF COOPER said there had recently been an inquiry into the medical tests by the War Office. The men had been rearranged in four categories, with a lower medical test for those who were not required to carry out the harder tasks. He hoped they would retain many recruits who might otherwise be rejected.

The Midwives Act

Sir KINGSLEY WOOD, answering a series of questions by Mr. Wm. Lunn on December 10th, said local authorities and voluntary associations had been invited to co-operate in implementing the Midwives Act. Consultations between them as the Act required were in progress throughout the country. Each local supervising authority had been sent a circular explaining the provisions of the Act and containing suggestions and advice on how the objects of the Act could best be secured. Under the Act local authorities were required to submit their proposals to the Minister by the end of January, 1937, and to carry them into effect not later than the end of July, 1937. Further measures it might be desirable to take for reduction of maternal mortality, in addition to those detailed in the recent report of the Chief Medical Officer of his department, would be reviewed on receipt of the report now in preparation of the special investigations recently made into maternal mortality in various parts of the country.

Board of Control

Answering Mr W. T. Kelly on December 14th Sir KINGSLEY WOOD said the Board of Control consisted of the chairman and four other members, styled Senior Commissioners. For the work of visitation and inspection the Board were assisted by twelve commissioners and four inspectors. All institutions (including mental hospitals) accommodating patients under the provisions of the Lunacy and Mental Treatment Acts, 1890–1930, and all institutions (including colonies for mental defectives) accommodating patients under the provisions of the Mental Deficiency Acts, 1913–27, were visited in each year, whether or not they were privately owned and conducted for profit.

N.H.I. Certificates in Pregnancy.—Sir KINGSLEY WOOD told Sir Robert Tasker on December 4th that Circular I.C. 324, issued to health insurance practitioners in 1930, was still in force. Sir Robert suggested withdrawing the circular and issuing one of more assistance to expectant mothers in obtaining incapacity certificates. Sir Kingsley, in reply, said he did not know any reason for its withdrawal or amendment.

Women Medical Officers.—On December 7th Mr. KELLY asked why women doctors in the Government employ received remuneration equal to that of their male colleagues, and why such equality was not recognized in respect of any other branch of scientific workers. Lieut.-Colonel COLVILLE said that the policy underlying the general practice of differentiating in the pay of men and women civil servants in the same grade was explained by the Prime Minister in the debate on April 6th last. Differentiation was made in the case of women scientific workers in accordance with the practice described on that occasion. Women medical officers were in a special position in connexion with that practice in view of the well-established outside custom of giving the same scales of pay to men and women in the case of medical appointments for which both sexes were eligible.

Milk-in-Schools Scheme.—Mr. ELLIOT, replying to the Duchess of Atholl on December 8th, said that at March 31st last there were 647,662 children in primary schools in Scotland, of whom 283,378 were receiving milk under the milk-in-schools scheme. More recent figures of the numbers supplied with milk in primary schools were not yet available, but in September approximately 321,000 children out of a total school population of 807,000 were supplied with milk under the scheme.

Housing in Glasgow.—Mr. ELLIOT, replying to Mr. Stephen on December 8th, said that the number of houses which the Glasgow Corporation had on their list for action under the Housing (Scotland) Acts as unfit for human habitation was, in the Mile End Ward 396 and in the Whitevale Ward 178. A number of these houses were infested with vermin, but definite figures could not be given. Where immediate closure of infected houses was impossible owing to lack of alternative accommodation the Corporation supplied an insecticide on request.

Deaths from Cancer.—Sir KINGSLEY WOOD, on December 11th, gave Mr. Rhys Davies the following statistics about deaths from cancer and kindred malignant tumours for England and Wales as a whole:

	Number of deaths (Persons)	Standardized death rates per million persons living
1926	53,220	999
1927	54,078	996
1928	56,253	1,011
1929	56,896	1,010
1930	57,883	1,003
1931	59,346	998
1932	60,716	1,001
1933	61,572	997
1934	63,263	1,003
1935	64,507	1,001

He added that corresponding figures for England and Wales separately are not available, although certain figures for Wales are given in the Registrar-General's Statistical Review (Part I, 1926/30, Table 20 ; Part I, 1931/35, Table 24 ; Text Volume, 1931/34, Cancer Section).

Slum Clearance.—Mr. HUDSON told Mr. Wm. Leach on December 14th that Exchequer contributions towards uncompleted programmes of housing authorities would continue at the present rate until March 31st, 1938. The contributions in respect of houses not completed until after that date would depend on the result of a review undertaken after October 1st, 1937, and would be provided for in an Order made after that review. The Minister of Health would approach the question with a full sense of the importance to the health services of the country of the completion of the slum clearance campaign.

Dermatitis in French-polishers.—On December 15th Mr. GRAHAM WHITE asked the Home Secretary if the inquiry in the prevalence of dermatitis among french-polishers had been completed, and whether any action was contemplated. Mr. GEOFFREY LLOYD replied: Yes, Sir. The results confirmed the view that french-polishing is one of the occupations specially liable to give rise to dermatitis, and that the most practical remedy is increased education of the workers in care of the skin. A great deal has been done to this end, but the question of taking further steps, including strengthening the law, to reduce this disease is under consideration.

Health Propaganda.—Mr. ROBERT HUDSON, answering Sir Nicholas Grattan-Doyle, said that on December 9th Sir Kingsley Wood knew a suggestion had been made for a national campaign of health propaganda, financed by insurance companies and approved societies, but no proposals had been made to him. Sir Kingsley was considering the general question of health propaganda.

Notes in Brief

Replying to Mr. Buchanan on December 15th Mr. Elliot said there were considerable numbers of cases in which four, five, and sometimes more families in tenements in Glasgow had to use the same water-closet. The worst cases occurred in properties which it was hoped would shortly be demolished under the Housing Acts. In such properties it was obviously inexpedient to require heavy expenditure on alteration or reconstruction for the provision of separate lavatory accommodation ; in many cases such works would be entirely impracticable. The remedy lay in rehousing the tenants, and he was doing everything possible to encourage progress in that direction.

Friday B. Von Ruedenhof (*Wien. klin. Woch.*, July 31st, 1936, p. 966) finds a definite relation between low blood pressure and alveolar atrophy. In eighty-six patients with incipient or fully developed alveolar atrophy she found a mean blood pressure of 111 mm. of mercury, whereas in fifty-six persons free of alveolar atrophy and of the same age the mean blood pressure was 142 mm. of mercury. The affection of the alveolus can be explained by the low capillary pressure which is related to the general blood pressure. The author therefore advises treatment of alveolar atrophy by means of local gum stimulants and by a general stimulation of the cardiovascular system.

Obituary

C. COURTENAY LORD, M.A., M.R.C.S.

Late Assistant Medical Secretary, British Medical Association

Dr. Cyril Courtenay Lord, whose death on December 8th we announced with regret last week, was born in 1872. From Cambridge, where he graduated B.A. in the Natural Sciences Tripos, he went to Birmingham for the clinical part of his course, taking the M.R.C.S.Eng. and L.R.C.P. Lond. in 1897, and his M.A. in the following year. After qualification he served in turn as resident medical assistant at the Birmingham General Hospital and as house-surgeon at the Queen's Hospital. He then started in general practice at Gillingham, Kent, and was for some years honorary physician to out-patients at St. Bartholomew's Hospital, Rochester.

Courtenay Lord joined the British Medical Association in 1910, and soon began to take an interest in medical politics and organization, both local and central. He was honorary secretary of the Rochester, Chatham, and Gillingham Division from 1912 to 1914, serving also on the Council of the Association and as representative of his Division at the Annual Meetings in Liverpool and Brighton. Those were the days of the Insurance Bill struggle, and Courtenay Lord was one of many who strongly opposed taking service under the Act. In 1913 he became a member of the Non-Panel Committee and the Organization Committee, having already served on the Public Health Committee; he was also a member of several subcommittees. In June, 1914, on his appointment as Assistant Medical Secretary of the Association, he gave up general practice and resigned from the B.M.A. committees of which he was a member. He obtained a commission in the R.A.M.C. soon after the outbreak of war, and was given leave of absence by the Council. Early in 1919 he returned to take up duties at headquarters, where his kindly good humour won him friends among all with whom he came in contact. He was chairman of the staff athletic club for some years and presided at its dinners. Outside office hours Courtenay Lord devoted much time to bee-keeping at his home in Kent, and he was a well-known exhibitor of honey. He had a love of the sea, and after retiring from the service of the Association at the end of 1930 made a number of voyages as ship surgeon. Later he was occupied mainly in temporary work for the R.A.M.C.

Dr. J. W. Bone writes:

At the time of his appointment in 1914 as Assistant Medical Secretary I came into close relationship with Courtenay Lord's work for the Association at headquarters, and this continued until his retirement in 1930. He was a most conscientious and painstaking worker, especially skilled in collecting and collating information for the use of the various committees which he served. On very many occasions his "Notes for Chairman" proved invaluable, not only in debates in committee but in the more strenuous task of upholding the Council's policy in the Representative Meeting. Perhaps his special interest was in the fighting Services; none knew better the details of all the terms and conditions of employment therein, and his advice, freely sought, was always at the disposal of medical men serving, or seeking to serve, their country. Some of his old colleagues may remember the zest with which, acting as a supernumerary surgeon on a Cunard liner, he undertook a trip to New York and back in order to try out the case-taking system which had been drawn up as part of a scheme to establish an international medical sea code.

Dr. Courtenay Lord was singularly happy in his home life: he found recreation in his garden and in his hobby as an apiarist. His last months were clouded by the somewhat unexpected death of his dear wife, soon to be followed by his own incurable and distressingly painful illness, borne with great fortitude.

Dr. Alfred Cox writes:

Courtenay Lord was a valued colleague of mine for sixteen years, and a very popular member of the staff. He took office under rather peculiar circumstances and at a very difficult time. He had taken an active part in opposing the national health insurance system, and his appointment was largely due to the efforts of those who were inclined to the view that the British Medical Association should resist its introduction, and, if it became law, work it under protest. Lord, however, loyally sank his own feelings and soon saw that now that the project had become law it was the duty of the Association to do all it could to make it work well on the medical side. I think he rather disappointed some of his supporters by taking this view, but he was essentially a loyal servant.

His work was mainly on the medico-political and Service sides. He acted for several years as secretary of the Naval and Military Committee, during which time we had the memorable struggle with the India Office. He always took a great interest, too, in ship surgeons, as he had previously had some experience in that work. He left the Association on pension before the usual age because, owing to prospective changes in the senior staff, and as both he and the other Assistant Medical Secretary were mature in age, the Council thought it desirable to introduce new blood. I did not see much of him after his retirement, but he is remembered by those who worked with him as a pleasant and loyal colleague.

ALFRED GREENWOOD, M.D., D.P.H.

Late Medical Officer for the County of Kent

We regret to record the death on December 4th of Dr. Alfred Greenwood, until recently medical officer of health for the county of Kent. Dr. Greenwood was born at Sheffield in 1873, and was educated at Wakefield Grammar School and Owens College, Manchester. He qualified in 1895, taking his D.P.H. in 1897 and his M.D. in 1900. After a period as house-physician at the Royal Infirmary, Manchester, and medical officer at the Children's Hospital in that city, he turned to a career in public health. He served as medical officer of health at Blackburn and at Crewe, and in 1913 became medical officer of health for the county of Kent, a position which he held for twenty-three years. During the war he served in the R.A.M.C. as a specialist sanitary officer from 1914 to 1916 with the rank of lieutenant-colonel. His writings are chiefly his annual and special health reports for Kent over a series of years. In 1925, following a visit to Eastern Europe, he published a volume of personal impressions of the public health administration of Yugoslavia. He took special interest in cancer research, and was a member of the Executive Committee of the British Empire Cancer Campaign.

Dr. Greenwood's personality and his great administrative gifts were valued by the members of the authority and the public whom he served, as well as by his colleagues in his branch of the profession. He was an active member of the Society of Medical Officers of Health, both during his career in Lancashire and in southern England, and he had been president of the North-Western and the Home Counties Branches. He became a member of the British Medical Association in 1901, and helped to form the Blackburn Division in 1903, becoming its honorary secretary, and so remaining until almost the time of his departure from Lancashire. In 1912-13 he was president of the Lancashire and Cheshire Branch. In that year of

many resignations—1913—Dr. Greenwood left the Association, rejoining it in 1924 and becoming president of the Kent Branch in 1931–2. He first served as a member of the Representative Body in 1908, and again became a representative in 1929 and following years. He was also a useful member of the Public Health Committee of the Association from 1933 to 1935. His contributions to debate were not frequent, but when he did speak it was always out of sound knowledge and experience. His death so soon after retirement is much deplored.

After a long illness Dr. ROBERT MCDOWELL died at his residence in Antrim Road, Belfast, on November 29th. He was a graduate of the Royal University of Ireland, obtaining the M.B. and B.Ch. degrees in 1896. He established himself in practice in Belfast, and over a period of years devoted himself to his patients and their interests. He was of a quiet, unassuming character, devoted to his family and beloved by all whom he served, and while he evinced a sincere interest in matters pertaining to his profession, he avoided public affairs. Some months ago failing health demanded the opinion of a professional colleague, and when McDowell knew his inevitable fate he faced the outcome with a stoicism and calmness that reflected the greatness of his character. He had a very large practice, and could genuinely call his patients his friends, for he had been to them through generations the family practitioner of the ideal so often desired. Deep sympathy is felt with his wife and two sons.

The following further details have been received of the career of Dr. GURTH EAGER, whose death we reported on December 12th at page 1240. He was born at Old Woking on April 3rd, 1881, the fourth son of Dr. T. C. Eager, member of an old Surrey family, and from King Edward School, Birmingham, went to King's College Hospital, where he worked as Dr. Arthur Cheatle's house-surgeon in the ear, nose, and throat department and in the children's department under Dr. Still. His knowledge gained in these posts served him to good purpose in general practice. He went to Hertford in 1908, where he worked until within a short time of his death, having built up almost single-handed a wide and successful practice in town and country. With experiences gained in tropical diseases during war service in Mesopotamia he was appointed medical officer to the Herts County Malarial Clinic, and for nine years after the war he was M.O. to the 1st Herts Regiment. Dr. Eager was a clever musician, which brought him to the fore in local and charitable entertainments. He was loved by all his colleagues on the staff of the Hertford County Hospital for his personality, his good humour, and his skill as a medical practitioner.

Dr. ALEXANDER MCC. D. MONYPENY died on December 4th, after a short illness, at his home in University Square, Belfast. He had returned from a well-deserved holiday abroad and got a chill, which developed into pneumonia. He graduated M.B., B.Ch. of Queen's University, Belfast, in 1927, and had acted as resident medical officer in the Royal Victoria Hospital and the Belfast Maternity Hospital. His father was a very well known and much respected practitioner in Belfast, and shortly after his death some years ago his son took over the practice. It soon became obvious that the gift which the father had of winning the affections of his colleagues was also that of his son in his generation, for Alec Monypeny was held in high esteem by those who knew him intimately as well as by those who met him but occasionally, and, moreover, he retained the regard of those who had known his father so well. That this was not a passing popularity nor the opinion of but a few individuals was proved by the extent of the practice which he attracted and the respect in which his patients held him. To these all, rich or poor, near or distant, he gave his unremitting care and attention ; personal convenience mattered nothing, and his patients learned that he would do for them everything that was in his power at any time, and for this very reason they never imposed upon him. He had that happy character which made him popular and respected, but never cheap ; while always professional he was never pompous ; with the colleagues of his own generation he was universally popular, and to them his passing leaves a void that will never be filled. All seemed set for a most successful and valuable career, and his death in his thirty-third year leaves a blank that is all the greater for its unexpectedness and suddenness. Dr. Monypeny was unmarried, but his widowed mother was his best companion, and a deep affection existed between them that renders his death all the more heart-breaking to her. To her and his sister (wife of Dr. A. A. F. Peel of Glasgow) the sympathy of all his colleagues goes out.

The death has occurred at Southport of Dr. ARTHUR LEGGE ROE, who for many years was well known in Hull in private practice and in connexion with the work of the Hull Royal Infirmary and the Hull and Sculcoates Dispensary. Dr. Roe, who was 82 years of age, died at the home of his daughter, where he had lived since his retirement from practice in Hull four years ago. He had been a member of the British Medical Association for fifty-three years. He was educated at Queen's College, Belfast, and in Dublin, obtaining the L.R.C.S.I. in 1873 and the L.R.C.P.I. in 1878. At the Royal College of Surgeons in Ireland he was a demonstrator of anatomy. Dr. Roe then joined the Royal Navy and became surgeon on H.M.S. *Research* and H.M.S. *Northumberland*, and served as surgeon at the Royal Naval Hospital, Plymouth. In 1886 he became resident medical officer to the Hull and Sculcoates Dispensary, where he later opened an ophthalmic department, and was appointed honorary ophthalmic surgeon to the dispensary in 1896. In 1906 he became assistant honorary ophthalmic surgeon to the Hull Royal Infirmary and in 1909 honorary ophthalmic surgeon, retiring from that office in 1914. During the war he joined the staff of the Naval Hospital, Hull. He was interested in medical research work and read a paper on colloidal silver to the Medical Society of Hull, of which he was honorary secretary from 1896 to 1897 and president in 1897. Dr. Roe was a keen dry-fly fisherman, and was well known throughout Yorkshire. He was the oldest member of the Rydale Club.

The Services

No. 14 STATIONARY HOSPITAL DINNER

The annual dinner of No. 14 Stationary Hospital officers was held on December 11th at the Trocadero Restaurant, with Major-General H. M. J. Perry, O.B.E., in the chair. There was a good attendance, even though illness had kept away several of the most regular attendants in previous years. An account of the progress of other members of the hospital staff during the previous twelve months was given as usual by Dr. H. L. Tidy, special reference being made to Colonels C. R. Evans, D.S.O., and J. R. Harper, C.B.E., who had been in command at different periods. The programme of the evening consisted of personal reminiscences of the events in the history of the hospital, and mention was made of the collection by Dr. Tidy of photographs and records which was being accumulated.

DEATHS IN THE SERVICES

Captain John Thurlow Clapham, R.A.M.C. (ret.), died at Woodside Hospital on December 11th, aged 70. He was born at Devizes on December 26th, 1865, the eldest son of the late Edward Clapham, M.D., was educated at Bart's, and took the M.R.C.S. and L.R.C.P.Lond. in 1888. Entering the Army as surgeon on January 31st, 1891, he was placed on half-pay on October 21st, 1901, and on the retired list five years later, on October 21st, 1906. He served in the Sudan campaign

of 1898, and received the Egyptian medal and the Khedive's medal. While on the retired list he was employed at Landguard in 1907–9. For many years he was honorary secretary of the Army Medical Officers' Widows' and Orphans' Fund and of the R.A.M.C. Central Mess Fund.

Universities and Colleges

UNIVERSITY OF OXFORD

On December 9th Sir Farquhar Buzzard, Bt., Regius Professor of Medicine, was adopted as Conservative candidate in the forthcoming Parliamentary by-election. There are now three candidates for the University seat, the others being Professor F. A. Lindemann (Ind. Cons.) and Sir Arthur Salter (Ind.).

The following candidates have passed in the examinations indicated:

MATERIA MEDICA AND PHARMACOLOGY.—J. W. Ashley, N. F. E. Burrows, C. D. Cormac, J. M. Couchman, P. S. Edgecombe, O. I. Green, M. W. Hemans, F. J. Ingham, J. N. Macdonald, G. K. McGowan, R. B. Niven, J. C. Prestwich, E. B. G. Reeve, T. R. Savage, J. Scholefield, R. A. Shawyer, T. Sutton Coulson, C. R. B. Welford, K. F. Wilsdon, E. J. Burchardt, D. C. Pedley, M. M. Pickles.

PATHOLOGY.—G. F. Bader, E. H. Hiley, R. M. Hugo, J. G. Jamieson, K. H. A. Marshall, R. B. Niven, T. R. Savage, C. W. Seward, M. A. Slee, B. M. Thornton, C. R. B. Welford, C. B. I. Willey, W. B. Young, W. E. Young.

FORENSIC MEDICINE AND PUBLIC HEALTH.—R. F. Bennett, R. G. Blackledge, B. A. M. Brown, D. I. Crowther, H. J. L. Dickinson, T. Gadian, A. C. Gray, N. J. S. Gurney, G. F. C. Hawkins, M. H. Hughes, F. J. Ingham, D. Jefferies, G. O. Jelly, J. Mason, H. J. de V. Mather, C. I. Murphie, R. B. Niven, A. R. Norton, R. G. W. Ollerenshaw, R. E. Ooi, M. G. O. Owen-Smith, G. M. Peskett, I. B. Pirie, J. L. Reid, T. F. Rose, D. A. F. Shaw, T. H. Shire, A. F. Smith, T. B. Snell, R. Y. Taylor, R. E. S. Thompson, G. B. I. Willey, W. Synne Wilson, W. B. Young, A. J. M. T. Barnes, J. M. Sherring.

At a congregation held on December 12th the following medical degrees were conferred:

D.M.—Cicely D. Williams.

B.M.—O. H. J. M. Telling, J. Walter, G. L. Peskett, F. R. P. Pepper, N. J. S. Gurney, A. T. M. Myres, C. R. Cone, T. H. Shire.

UNIVERSITY OF CAMBRIDGE

The Faculty Board of Medicine has appointed Dr. G. S. Graham-Smith, Dr. G. H. Orton, Dr. Ff. Roberts, Dr. F. G. Spear, Mr. R. Williamson, Dr. E. P. Cumberbatch, Dr. P. J. Kerley, Dr. W. P. Philip, Dr. R. J. Reynolds, and Professor S. Russ to be members of the Committee for Medical Radiology and Electrology for the year 1937.

UNIVERSITY OF LONDON

The following candidates have been approved at the examination indicated:

THIRD M.B., B.S.—*‖D. L. H. Goddard, *‡J. S. Horn, *§S. A. Jenkins, *§S. Marinker, *‡§J. W. Pierce, *†G. R. Royston, *‡E. Samuel, *†J. E. Spalding, G. P. Arden, Minnie Atkin, S. Balasingam, B. J. Bickford, Beatrice A. Blake, R. Bolton, L. C. Bousfield, H. V. Brown, I. S. Buchanan, G. D. Channell, R. F. Clarke, F. E. Corea, Hilla Damry, C. S. Darke, D. A. Davies, D. J. Davies, D. R. Davies, A. M. Desmond, C. W. Dixon, R. B. Evans, W. J. M. Evans, J. D. O. Fearnley, Margaret A. B. Fleming, K. D. Fraser, J. E. Furness, R. E. Gibson, T. N. Grundy, W. H. Hamilton, J. A. J. Hammond, Gladys I. Jeffree, Joyce B. Jewson, Helen M. Kennedy, G. A. Kiloh, Marjorie F. Landau, S. W. Lane, L. R. Leask, M. Lederman, V. N. Leyshon, J. P. McGladdery, D. H. G. MacQuaide, Alison J. McNairn, M. Markowe, J. H. Mayer, J. A. W. Miller, Robina M. D. Morell, Ananda Nimalasuria, Peggy C. Permain, J. H. Playne, S. W. Pratt, E. Price, E. P. Rigby, J. Ll. D. Roberts, Kathleen M. Robinson, E. ap I. Rosser, K. G. Rotter, D. M. Samuel, J. K. Samuel, D. A. Sanford, Olive M. Singer, E. H. J. Smyth, G. T. Stockings, S. F. Thomas, Catherine M. Whitestone, J. R. Wilson, Eluned Woodford-Williams, G. N. Wright, P. J. M. Wright, Ruth E. Young. *Group I:* H. I. C. Balfour, Beryl E. Barsby, Irene B. Black, Jane Bonnell, C. M. Bowker, J. A. G. Carmichael, D. A. Davies, R. D. L. Davies, G. S. W. de Saram, Margaret R. Dix, Gwenda M. Francis, M. Hamilton, L. Henig, Denise O. Henry, F. G. Hollands, S. F. Jayawardene, Ursula J. Jeffery, Constance A. Mallett, Winifred F. G. Murray, J. E. R. Palmer, D. E. Parry, A. N. Roy, L. J. Sandell, Sheila G. Snook, R. W. Taylor, R. N. E. Watt, J. C. Watts, Joan M. Wenn, F. H. Yates. *Group II:* J. C. Baillie, Gwendolen K. G. Coote, E. C. Dax, M. P. Embrey, D. R. Hanbury, T. H. Hills, I. Hywel Davies, Mabel E. Linscott, D. de la C. MacCarthy, Mary B. Mellersh, A. G. Moore, F. J. Moore, O. N. Ransford, Ethel M. Strong, R. J. C. Sutton, Mer Thomas, P. H. Tooley, A. M. Williams.

* Honours. † Distinguished in medicine. ‡ Distinguished in pathology. ‖ Distinguished in forensic medicine and hygiene. § Distinguished in surgery.

UNIVERSITY OF SHEFFIELD

The following appointments were made at a meeting of the University Council held on December 11th, with Sir Henry Stephenson in the chair: Mr. J. L. A. Grout, F.R.C.S.Ed., D.M.R.E., to the newly created post of honorary lecturer in radiological anatomy; Dr. G. Clark as junior assistant bacteriologist; and Dr. W. A. Timperley as research fellow in the department of physiology.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

A Council meeting was held on December 10th, with Sir Cuthbert Wallace, the President, in the chair.

A resolution of condolence was passed on the death of Sir Edwin Deller, late Principal of the University of London.

Mr. R. Davies-Colley (Guy's) and Mr. G. T. Mullally (Westminster) were elected and admitted as members of the Court of Examiners. Mr. H. F. Humphreys (Birmingham) was elected a member of the Board of Examiners in Dental Surgery.

The Hallett Prize, granted on the results of the Primary Examination for the Fellowship in November last, was awarded to Robert Evan Owen Williams (University College).

The Council adopted the following as the reply to the resolution passed at the recent annual meeting of Fellows and Members:

"That the Council having carefully considered and discussed the report of the proceedings of the annual meeting of Fellows and Members on November 19th, 1936, can see no reason for reopening the question of altering the constitution of the College. The main function of the College is to promote the study and practice of surgery. If there are any matters in this connexion to which Members of the College wish to draw attention, an opportunity for so doing is afforded at the annual meeting of Fellows and Members, while the Council will at all times welcome and give careful consideration to representations made to it by any Member or body of Members of the College in reference to matters which come within the functions of the College."

The Council gratefully accepted the offer of Lord Moynihan to present to the College a bust of his father and his collection of instruments. It also gratefully accepted a gift of historic anaesthetic apparatus from Dr. R. J. Probyn-Williams.

Diplomas

Diplomas of Fellowship were granted to the following fifty-four candidates:

Elaine M. K. Salmond, Gladys Hill, H. Treissman, D. C. McC. Ettles, C. C. Cookson, N. E. Pitt, A. L. Pereira, A. N. Birkett, M. Baillie, I. G. Williams, J. Howkins, F. R. Kilpatrick, T. F. R. Griffin, H. B. Lee, L. Z. Cosin, G. C. D. Roberts, D. O. Davies, S. K. Ghosh, C. J. B. Murray, W. G. O. Mills, A. S. Till, S. G. Clayton, E. O'D. C. Grattan, J. Hughes, J. H. Kellgren, G. B. Davis, T. M. Williams, H. K. Doctor, R. L. Mehra, S. O. Aylett, J. Charnley, P. W. Clarkson, D. N. Matthews, J. F. Healey, D. W. Ashcroft, N. J. Bonnin, H. L. Cochrane, W. B. Dickson, A. Dornan, A. S. Gray, N. M. Harry, W. G. Johnston, F. R. Leonard, C. P. V. Menon, T. Moore, W. A. B. Nicholson, K. I. Nissen, D. P. O'Brien, L. J. T. Pellew, L. M. Snaith, J. A. Stallworthy, B. W. Stevens, O. G. Tunks, E. W. Bintcliffe.

A diploma of Membership was granted to Irene Katherine Hezlet.

Diplomas in Anaesthetics were granted, jointly with the Royal College of Physicians of London, to the following nineteen candidates:

R. H. Blazeby, C. H. Catlin, G. Edwards, Eva M. Gray, Elizabeth M. Handfield-Jones, T. A. B. Harris, T. H. Hobbes, G. H. W. Keates, Rosalind M. P. Milne, Joyce Morgan, L. O. Mountford, A. H. Pirie, J. W. Redgate, J. E. C. Rouse, H. B. C. Sandiford, R. L. Soper, Edith J. Thompson, F. A. H. Wilkinson, R. F. Woolmer.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH

At a meeting of the College held on December 3rd Dr. W. T. Ritchie, O.B.E., was re-elected President, and the following were elected to form the Council of the College for the ensuing year: Dr. Edwin Bramwell, Dr. Alexander Goodall, Dr. John D. Comrie, Dr. Charles McNeil, Dr. Fergus Hewat, and Dr. D. M. Lyon. Dr. Goodall was nominated Vice-President.

Medical News

The Académie de Médecine has unanimously promoted Sir StClair Thomson, already a Foreign Correspondent, to be a Foreign Associate. The number of the latter is limited to twenty, and among them there is not at present any other representative of oto-laryngology.

Professor G. Grey Turner has been elected a Foreign Associate of the Académie de Chirurgie of France.

The House of the British Medical Association, including the Library, will be closed for the Christmas holiday from 6 p.m. on Thursday, December 24th, to 9 a.m. on Monday, December 28th (Library 10 a.m.).

The House and Library of the Royal Society of Medicine will be closed for the Christmas holiday from Thursday, December 24th, to Saturday, December 26th, both days inclusive.

The twenty-seventh annual exhibition of scientific instruments and apparatus, arranged by the Physical Society, will be held at the Imperial College of Science and Technology, Imperial Institute Road, South Kensington, S.W.7, on January 5th (2.30 to 9 p.m.), January 6th (4 to 9), and January 7th (2.30 to 9). Admission is by ticket only, to be obtained from the Exhibition Secretary, 1, Lowther Gardens, Exhibition Road, S.W.7.

The first International Congress of Pyretotherapy will take place at Columbia University, New York, U.S.A., on March 29th, 30th, and 31st, 1937. There will be reports and discussions on the action of the different pyretogenic agents and the clinical results obtained. Visits will be paid to Philadelphia and Washington, where the delegates will be received by President Roosevelt. The British committee is as follows: Dr. Cameron, Dr. G. Graham, Dr. N. B. Graham, Sir Ernest Graham-Little, Dr. D. T. Harris, Dr. G. W. C. Kaye, Mr. Ambrose King, Dr. W. V. Mayneord, Dr. F. J. Nattrass, Dr. B. D. H. Watters, and Dr. W. Kerr Russell (honorary secretary), 126, Harley Street, W.1.

The Sir Halley Stewart Trust has placed at the disposal of the Medical Research Council a sum of £500 per annum for three years for a senior fellowship tenable in the neurological research unit at the National Hospital for Nervous Diseases, Queen Square, London. This arrangement has been gratefully accepted by the council with the concurrence of the medical committee of the hospital, and the position has been awarded to Joseph Doupe, M.D.Winnipeg, M.R.C.P.Lond.

At the meeting of the Central Midwives Board for England and Wales held on December 3rd the application of the London County Council for the approval of St. Mary Islington Hospital for the purpose of Rule E.2 was granted. Approval as lecturer was granted to Dr. Isabella Margaret Sutcliffe, York Maternity Hospital, and Dr. Stanley William Wright, Stoke-on-Trent City Hospital.

Treatment by blind chartered masseurs was demonstrated to guests at an "At Home" given by Lord and Lady Horder on December 10th at the Eichholz Memorial Clinic, 204, Great Portland Street, London. The clinic was founded by the National Institute for the Blind in 1934 to serve as a centre for physiotherapy by the blind. The conditions treated during the evening included rheumatoid arthritis (diathermy), flat-foot (faradic bath), insomnia (massage), stiff shoulder (infra-red radiation with massage), Colles's fracture (wax bath), digestive disorders (Swedish remedial exercises), weight reduction (foam bath), and bronchial neuritis (anodal galvanism).

An outbreak of scarlet fever is reported from Doncaster, fifty cases having occurred up to date in the county borough and five in the neighbouring rural district. All these patients had consumed raw milk from the same source, and it is reported that a milker on the farm in question has been found to be suffering from illness which is probably of scarlatinal origin. The local authorities are taking appropriate steps to prevent the spread of infection, and a medical officer of the Ministry of Health is about to visit Doncaster to give advice or assistance.

The November issue of *Surgery, Gynecology, and Obstetrics* contains a signed appreciation of Lord Moynihan by the great American surgeon Dr. W. J. Mayo, who describes his purpose in reviewing the life of Moynihan as "to show him in the picture of his time in England, sketching briefly the achievements which made him outstanding, not only in his profession, but in the intellectual strength of Britain."

On October 1st, 1933, 3,423, or 59.7 per cent., of the 6,558 Berlin doctors, and 59.7 of the club doctors were Jews. According to the most recent estimate the total number of Berlin doctors is 6,277, of whom 2,143, or 34.2 per cent., are Jews.

The French Government has issued a decree this autumn with regard to the manufacture and sale of therapeutic sera.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to **The EDITOR, British Medical Journal, B.M.A. House, Tavistock Square, W.C.1.**

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone, unless the contrary be stated. Correspondents who wish notice to be taken of their communications should authenticate them with their names, not necessarily for publication.

Authors desiring REPRINTS of their articles published in the *British Medical Journal* must communicate with the Financial Secretary and Business Manager, British Medical Association House, Tavistock Square, W.C.1, on receipt of proofs. Authors over-seas should indicate on MSS. if reprints are required, as proofs are not sent abroad.

All communications with reference to ADVERTISEMENTS, as well as orders for copies of the *Journal*, should be addressed to the Financial Secretary and Business Manager.

The **TELEPHONE NUMBER** of the British Medical Association and *the British Medical Journal* is EUSTON 2111.

The **TELEGRAPHIC ADDRESSES** are
EDITOR OF THE *BRITISH MEDICAL JOURNAL*, *Aitiology Westcent, London.*
FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate Westcent, London.*
MEDICAL SECRETARY, *Medisecra Westcent, London.*

The address of the B.M.A. Scottish Office is 7, Drumsheugh Gardens, Edinburgh (telegrams: *Associate, Edinburgh*; telephone: 24361 Edinburgh), and of the Office of the Irish Free State Medical Union (I.M.A. and B.M.A.), 18, Kildare Street, Dublin (telegrams: *Bacillus, Dublin*; telephone: 62550 Dublin).

QUERIES AND ANSWERS

Cost of Hospital Building

On May 12th, 1934, we published a note on the cost of hospital building, prepared by a special committee of the Royal Institute of British Architects. Copies of the report were at that time obtainable from the Institute, but it is now out of print. We learn from Dr. James B. Hanna (I. P. Mission Hospital, Anand, Kaira District, India) that he is interested in the building of two new mission hospitals in the Bombay Presidency, and is anxious to secure a copy. He asks whether any reader would be willing to lend or sell him a copy.

Staining for Reticulocytes

Dr. L. P. L. FIRMAN-EDWARDS (Ryde) writes in reply to "J. B. L." (*Journal*, December 12th, p. 1242): A simple method of demonstrating reticulocytes in blood is as follows. Prepare a saturated solution of brilliant cresyl blue in absolute alcohol and keep in a glass-stoppered bottle. Pour two or three drops on to a glass slide and, after allowing them to flow evenly over the slide, leave it to dry. When required for use put a drop of the blood on the centre of a clean cover-slip and press it gently on to the slide. In a few minutes the reticulocytes can be seen among the other erythrocytes with a 1/8-inch or a 1/2-inch oil-immersion objective. The chief point is not to use too much stain, or the reticulocytes are obscured by the stained plasma. If "J. B. L." follows this technique he will have no difficulty, and the solution lasts indefinitely if kept well stoppered.

Onychopathy

Dr. J. R. TAYLOR (Levenshulme) writes in reply to Dr. Edwin F. D. Baker (*Journal*, December 12th, p. 1242): A line of treatment I have found effective for nails distorted by chronic inflammation of the nail-bed is the use of monsol germicide. It is brown in colour, and if applied too liberally takes a long time to wear off. It should be carefully applied

in small quantity. I instruct patients to use a match-stick pared down. This is dipped in the germicide and carefully pushed underneath the epidermis over the base of the nail along its whole width. It is allowed to dry on. This is done nightly for a week. It is painless and safe, and I can thoroughly recommend it.

LETTERS, NOTES, ETC.

The Common Cold

"X. Y. Z." writes from London, W.1: In view of the large amount of money and still larger amount of work which is being ineffectually expended on the common cold, any preventive measure is worthy of a trial. As Sir Arthur Keith tells us, we as a nation are rapidly acquiring the adenoid facies through mouth-breathing. As a life-long sufferer from nasal catarrh and colds I have noticed that since taking a brisk walk at night with the mouth shut I have only had three days *hors de combat* in eighteen months. Incidentally such a walk is a perfect hypnotic. The rationale would appear to be that the cold night air causes hyperaemia of the nasal mucosa, and this increase of blood serves to kill the filterable viruses which are apparently the cause of the common cold. Some difficulty may be experienced at first in relearning the art of nose-breathing; in such cases a little menthol ointment smeared up the nostril will help; this should be discontinued as soon as possible.

Medical Auxiliaries

Mr. A. MACE writes: Publication in your pages of Dr. Turrell's address on electrotherapy given to the British Medical Association Meeting makes it possible to examine more carefully statements which have been discussed in medical and medical auxiliary circles since they were made at Oxford in July. May I be allowed to present views which, I believe, are held by many of those who will figure in the *Register of Medical Auxiliaries*, which is to take the place of those "lists of mere technical assistants" to which Dr. Turrell refers in his address and upon the purpose and objects of which he comments at such length, and, as we venture to think, so inaccurately? Expressing in the first place, as all must do, the great debt which physiotherapy, and electrotherapy in particlar, owes to Dr. Turrell, a past master in the art of applying physical methods to the alleviation and cure of disease, may I set down a few of the points for the further consideration of this great specialist touching the relations (present and future) of medical auxiliaries to medicine and the medical profession. (1) "Possessed of no clinical knowledge of disease." As applied to medical auxiliaries surely this is an unfortunate statement, self-contradicted later by Dr. Turrell himself when he states that the technical assistant's "experience may teach her" that an inexperienced doctor's prescription "is far from being the most suitable form." Surely preliminary teaching, training, and long practice in any medical art should spare him or her the accusation of having "no clinical knowledge." (2) "The British Medical Association is now publishing lists of these mere technical assistants . . . and advising medical men to send their patients to them." The implication here is that medical men are "advised" (by the British Medical Association) to rid themselves of patients and turn them over to others less qualified for treatment. This is neither a fact nor a procedure to which the *Register of Medical Auxiliaries* lends itself. We as members of this register pledge ourselves to work under medical direction; doctors who send us patients for treatment do so in the same spirit in which they send a patient to the drug store with a prescription or, to achieve a nearer parallel, to a gymnasium for a course of physical exercises. (3) "Can the medical profession allow a method, so generally called for, to pass from its hands into those of unqualified practitioners?" This is but a restatement in very general terms of the assertions already dealt with, and is subject to the same reflection—namely, that it is set down without qualification and with reference to a procedure approved by the British Medical Association and without doubt wisely so approved in the best interests of the future of the profession and its *qualified* assistants.

Comfort and Health of Coal Miners

In a paper entitled "The Morbid Miner," read before the Edinburgh Medico-Sociological Club and published in the *Edinburgh Medical Journal*, Dr. D. Elliot Dickson alludes to the notable increase in the incidence of certain diseases among the coal-mining community. In the years preceding the war cases of peptic ulcer were uncommon and neurasthenic troubles almost unknown. These conditions are now remarkably prevalent. In accordance with the growing tendency to associate peptic ulcer with a psychoneurotic basis Dr. Dickson analyses modern mining conditions with a view to finding a psychological cause. From intimate personal contact with miners of all ages he has noted a widespread feeling of passive dissatisfaction, amounting almost to a repression. Despite improvements in ventilation and many other advances, the increased mechanization of the industry has caused the individual miner to feel less happy in his work. The pleasure of the craftsman is lost. The men feel that they are merely cogs in a wheel; they must keep up with the machine. The question of wages, inadequate though they may be, is a negligible factor in comparison to conditions of work. Dr. Dickson argues that comfort, in the largest sense of the term, is essential for the maintenance of health, and his observations among the Scottish miners whom he knows so well afford ample support for this view.

Calendars for 1937

Messrs. Howard and Sons Ltd. (chemical manufacturers, Ilford) have sent us a copy of their calendar for 1937, which has attractive pictures of old drug jars. A copy will be sent to any practitioner on application to the above address. We have also received from Messrs. Frederick Aldridge (Paternoster House, London, E.C.4) the *Hospital Diary* for 1937, edited by Mr. F. P. Carroll. In addition to the usual features of a diary it contains special articles and references of particular value to hospital officers. It is published at 5s. 6d., post free. Messrs. William R. Warner and Co. Ltd. (300, Gray's Inn Road, W.C.1) have again issued their diary and calendar of medical history, and copies will be sent free on request to doctors residing in Great Britain and Northern Ireland. Applications made after December 31st should be sent to Power Road, Chiswick, 4.

A Warning

Dr. M. G. KIERANS (Clones) wishes to warn Irish practitioners in Ireland and elsewhere against a person who travels about the country seeking medical assistance from doctors for a bogus complaint, and sometimes asking for money also. This man is understood to have had several convictions in England. His age is about 32; he is a labourer by trade, of medium height and fair complexion, with a scar on the left side of the neck. He poses as the son or relative of a prominent Irish public man. At present he is wanted by the civic guard of Co. Monaghan and Co. Cavan. Any doctor receiving a visit from such a person should communicate at once with the nearest guard or police station.

Corrigenda

The last sentence of our paragraph on "Health Conditions in Hull" (December 12th, p. 1224) was unhappily worded. The relevant passage in the medical officer of health's report reads as follows: "It is of interest to note that specimens of mosquitos and mosquito larvae obtained in the city were submitted to the director of the British Mosquito Control Institute at Hayling Island, who reported such specimens confirmed an investigation which was being carried out at their laboratory and indicated a new strain of *Culex pipiens* of a vicious character which had not yet been named." *Culex pipiens* is the name of the common gnat (commonest of the twenty-six species of mosquito found in Britain); it was so named by Linnaeus.

In the Proceedings of Council published in the *Supplement* of November 21st (p. 269) the sentence near the end of column 1 on page 273 relating to an Egyptian matter should have appeared under the heading "Other Business," not under the heading "Colonial Medical Service."

In Dr. P. Hegarty's letter "Substances Promoting Cell Growth" in last week's *Journal* (p. 1228) the word "ectodermal" in the sixth line from the end should be "entodermal."

Vacancies

Notifications of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 46, 47, 48, 49, 50, 51, 53, and 54 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 52 and 53.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page 336.